

REVISION OF THE AMERICAN PARASITIC FLIES BELONGING TO THE GENUS *WINTHEMIA*

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Parasitic flies of the genus *Winthemia* are perhaps more often reared in economic work than any other species of Tachinidae. Coquillett in 1897¹ recognized four species from America north of Mexico, and hitherto no comprehensive work on the genus has been published. The present paper contains descriptions of 32 species, of which 16 are new to science. In the preparation of this paper I have studied the material contained in the United States National Museum, which includes the types or specimens compared with types of practically all the previously described American forms.

I am greatly indebted to Dr. J. M. Aldrich, associate curator of the division of insects, for placing the facilities of the United States National Museum at my disposal, and for numerous other favors, particularly for the use of his notes on the types of several American species in European museums, which have proved invaluable in clearing up uncertainties that otherwise could not have been elucidated. Acknowledgment is gratefully made also to A. B. Conner, director of the Texas Agricultural Experiment Station, and to the United States Bureau of Entomology for providing an opportunity to conduct this study, and to Charles T. Greene for preparing the drawings herein included. I am under obligation to C. Howard Curran for the privilege of examining the material contained in the American Museum of Natural History, including two undescribed forms for which credit is given under each species. My thanks are due the late Prof. James S. Hine and also to Dr. Charles Robertson, Dr. T. H. Frison, Colbran J. Wainwright, and Ray T. Webber, who generously loaned material for study. Determined specimens of *Winthemia quadripustulata* received from the eminent European authority, Dr. J. Villeneuve, have been very useful in making determinations of our American forms.

¹ U. S. Dept. Agr., Bur. Ent., Tech. Ser. No. 7, pp. 124-125, 1897.

Genus *WINTHEMIA* Robineau-Desvoidy

- Winthemia* ROBINEAU-DESVOIDY, Myodaires, p. 173, 1830. [Type, *Musca variegata* Fabricius, originally included, by designation of Robineau-Desvoidy, Dipt. Env. Paris, vol. 1, p. 207, 1863. Although *M. variegata* was not described by Fabricius but as *Tachina variegata* (Syst. Reschr., vol. 4, p. 256, 1824), Robineau-Desvoidy in 1830 and 1863 included the reference to *Tachina variegata* Meigen, leaving no doubt as to the species intended. But since *Tachina variegata* Meigen equals *Musca quadripustulata* Fabricius (Stein, Aus. Nachr., vol. 26, p. 150, 1900), the latter, also an originally included species, becomes the genotype.]—COQUILLET, Revis. Tachin., p. 124, 1897.—ALDRICH, Catalogue, p. 473, 1905.—ADAMS, in Williston's North Amer. Dipt., p. 375, 1908.—TOTHILL, Can. Ent., vol. 44, p. 1, 1912.
- Microtrichodes* MACQUART, Dipt. Exot., suppl. 1, p. 288, 1846. [Type designated, *analis*, new species. I have not seen the type.]
- Masipoda* BRAUER and BERGENSTAMM, Zweifl. Kais. Mus., vol. 4, p. 162, 1889. [Type designated, *geminata*, new species. Not examined by the writer.]
- Trisisyropa* TOWNSEND, Ins. Insc. Menst., vol. 4, p. 28, 1916. [Type designated, *vesiculata*, new species. I have seen the type.]
- Okea* TOWNSEND, Ins. Insc. Menst., vol. 4, p. 74, 1916. [Type designated, *Winthemia okefenokeensis* Smith. I have examined the type.]
- Neowinthemia* TOWNSEND, Proc. U. S. Nat. Mus., vol. 56, p. 583, 1919. [Type designated, *abdominalis*, new species. I have examined the type specimen.]
- Nemosturmia* TOWNSEND, Ins. Insc. Menst., vol. 14, p. 34, 1926. [Type designated, *pilosa*, new species. Equals *Winthemia fumiferanae* Tothill, according to Aldrich, Bull. Brooklyn Ent. Soc., vol. 22, p. 24, 1927; subsequently verified from the type by Doctor Aldrich in correspondence.]
- Hemimasipoda* TOWNSEND, Revista Museu Paulista, vol. 15, p. 267, 1926. [Type designated, *brasiliensis*, new species. Equals *Winthemia pinguis* Fabricius. I have examined a type specimen.]

In submitting the above synonymy I should point out that there is no type specimen of *quadripustulata* in existence, and it is only in a traditional sense that the name *Winthemia* can be used at all. I have accepted Dr. J. Villeneuve's determination for the species and deem it expedient to make no further attempt in obtaining a name based upon an unquestioned genotype. The ultimate solution of this problem rests with European dipterists. Since the name is accepted by them, it appears logical for us to concur; although we are employing a name here that is open to question, we have the consolation of retaining a well-known and a long-used name that is almost as old as the science of dipterology itself.

The American species of *Winthemia* are strikingly uniform in most of their characters, and even those forms that show specializations in the structure of the fore tarsi are well within the range of the rest of the genus. The latter is fully recharacterized below from the type species *quadripustulata*, as determined by Dr. J. Villeneuve. On the following pages an attempt has been made to characterize adequately each American species to distinguish it from *quadripustulata* and the other known forms without the profitless repetition of all details identical with the type species.

Generic characters (from the type species).—Head wider than high, the length at vibrissae shorter than at antennae, posterior surface flattened or but slightly bulging below. Eyes densely hairy, in profile extending below level of vibrissae. Antennae inserted above middle of eye, third joint one and one-half times the length of second; arista bare, a little longer than antennae, with short but distinct basal joints. Face somewhat receding, moderately excavated and slightly keeled; ridges bare except a few hairs at base; parafacials hairy. Oral cavity large, in profile the lower margin straight behind and sloping abruptly upward on about the anterior third; vibrissae somewhat approximated, situated near level with front border of oral margin but distinctly above the lower edge of head. Front rather prominent below, much narrowed above in male, not in female. Proboscis very short, stout, labella large and fleshy; palpi normal in size. Cheeks in profile one-seventh the eye height, thickly clothed with fine hairs. Frontal bristles in two rows, which diverge below base of antennae and extend to apex of the second joint, in male all bristles directed inward, becoming smaller above, stopping before triangle, in female the two uppermost larger and reclinate; verticals two pairs, outer ones small or hairlike in male; two pairs of orbitals in female, none in male; ocellar bristles present, proclinate, behind the ocellar triangle another pair, erect, and still another but wider-spaced pair behind these on the occiput. Posterior orbits moderately wide below, narrowed and almost linear above, the occipital fringe with some long hairs above the middle and only pale ones behind.

Thorax a little narrower than head, viewed from above distinctly longer than broad with the sides nearly parallel, suture well before middle; humeral and pleural hairs black, some with noticeable wavy tips. Chaetotaxy: Acrostichal, 3, 3; dorsocentral, 3, 4; humeral, 5; posthumeral, 2 or 3; notopleural, 2; presutural, 2; intraalar, 3 (none near suture); supraalar, 3; postalar, 2; mesopleural, 7 or 8 behind, 3 at lower front angle; propleural, 2; pteropleural, 1 (small); hypopleural, 6 to 8; sternopleural, 1, 1; scutellum with three lateral, one smaller decussate apical, and one discal pair. Postscutellum well developed; postnotum beneath calypter bare; prosternum with fine hairs at sides.

Abdomen short ovate and rather flattened; intermediate segments without discal bristles; first with a pair of median marginals; second also usually bearing one pair (sometimes two or more); third with a marginal row of about 10; fourth with two irregular rows near the apex. Male genitalia small and retracted, with the usual inner and outer forceps, the former united except near apex and keeled behind, the latter thin or flattened structures tapering outward from base.

Female with the genitalia terminating in a thick fleshy tubular ovipositor.

Legs rather slender; hind tibiae ciliate, usually with one longer bristle near middle; claws and pulvilli elongate in male, not in female.

Wings ordinary in shape; fourth vein without stump at bend, the last section curved inward; hind cross vein joining fourth much nearer bend than small cross vein; last section of fifth vein very short. First posterior cell open well before wing tip. Veins bare except a few hairs at base of third. Costal spine vestigial or absent.

Specific characters.—Our species separate into two groups in the male sex on the presence or absence of abdominal patches of matted hairs on the venter of the third or fourth tergites. I consider the patches present only when they are limited by a sharp or well-defined margin. Several species are intermediate in this respect, for example, in *deilephila*, *cecropiae*, and *latevittata* the venter of the third and fourth abdominal segment at the center on either side is thickly pilose, but the hairs gradually become thinner and shorter outward from the middle and blend with the normal vestiture at the sides without any definite break or margin circumscribing the dense hairs. These and all similar forms are included in the series considered to have the patches absent.

The abdominal patches referred to are developed in a number of different ways seemingly constant within the species and offer several good characters of taxonomic value. Although the male genitalia are very similar in structure throughout the group, the shape and comparative length of the inner and outer forceps are quite distinctive for a number of species. The females offer even fewer characters than the males, and except in rare cases they can not always be separated with certainty or associated with the opposite sex. The width of the front in relation to the total head width, especially in the males where the greatest variations occur among species, and the length of the third antennal joint compared with the second, furnish serviceable characters for classification, although some variations must be anticipated. Thoracic chaetotaxy is quite too uniform to give any specific characters aside from a few cases, and I have omitted it almost entirely. Details of the frontal bristles and of the pollen on the front, face, and abdomen furnish additional points of some value in separating the species. The color pattern of the abdomen varies within some species and must be viewed with suspicion. The ciliation of the hind tibiae is developed in various degrees but is subject to sexual variation in the species. In the females the genitalia are identical in structure throughout consisting of a fleshy protractile blunt-tipped ovipositor.

The genus shows about the same combination of external characters as *Zenillia* Robineau-Desvoidy; in the latter, however, the parafacials are entirely bare and the genitalia are of a different type.

Biology.—As has already been stated, species of *Winthemia* are frequently encountered in economic work, and our literature of the past 30 years contains a list of several hundred rearing records from 40 or more different hosts. Unfortunately, several species have been confused under the name *quadripustulata* and a large majority of the reported rearings are subject to verification. Several authors have called attention to the importance of the so-called "red-tailed tachina fly" in controlling infestations of the army worm. It seems quite certain that this common army-worm parasite is not *quadripustulata*, as it has been commonly determined, but a distinct form rediscovered as *rufopicta* in the present paper. In the files of the United States National Museum there are several records of rearing *Winthemia*s from coleopterous larvae and adults, but the vast majority of the rearings are from lepidopterous larvae. So far as is known, the reproductive habits are the same in all the species. The females deposit flattened macrotypes eggs on the body of the host. This is Pantel's first group, which includes *Nemorilla*, *Exorista*, etc.

KEY TO SPECIES OF WINTHEMIA

MALES

1. Venter of abdomen without defined patches of dense hairs----- 2
Venter of abdomen with defined patches of dense hairs----- 18
2. Abdominal hairs long and erect----- 3
Abdominal hairs depressed, if erect not unusually long----- 6
3. Scutellum bearing three lateral bristles----- 4
Scutellum with only two lateral bristles; sides of front and face plumbeous; ocellars weak or hairlike; third antennal joint three times the length of second (California).
antennalis Coquillett (p. 10)
4. Legs wholly black or tibiae at most obscurely reddish----- 5
Tibiae pale yellow, the middle pair with two stout bristles near middle on outer front side; abdomen densely gray pollinose (? Massachusetts)----- *tibialis*, new species (p. 11)
5. Sternopleurals three; uppermost frontals large, erect or reclinate; front very narrow, 0.127 of the head width; abdomen largely black, strongly tapering to apex, the hairs rather fine and dense (Canada and United States, widespread).
fumiferanae Tothill (p. 12)
Sternopleurals two; uppermost frontals reduced in size situated before triangle; front 0.2 of the head width; abdomen distinctly reddish on sides and apex, the hairs coarse (Europe, New England to Washington, and New Mexico).
quadripustulata Fabricius (p. 14)
6. Prosternum with only fine hairs at sides----- 7
Prosternum bearing one or more bristles on either side; abdomen largely reddish (North America, widespread).
deilephilae Osten Sacken (p. 33)

7. Claws and pulvilli elongated..... 8
 Claws and pulvilli not exceeding the length of last tarsal joint;
 front fully three-fourths the width of eye; robust species
 (Illinois)..... *cecropiae*, new species (p. 34)
8. Parafrontals yellow or golden pollinose..... 9
 Parafrontals plumbeous or gray at most faintly tinged with
 yellow..... 14
9. Mesonotum shining black, the stripes almost entirely obliterated..... 10
 Mesonotum obviously pollinose, the black stripes distinct at
 least before the suture..... 11
10. Abdomen with striking thick pale golden pollen extending
 almost to the hind margins on the intermediate segments and
 obscuring the red color on sides; palpi brownish or yellow at
 tips (Virginia, Pennsylvania, Ohio)..... *abdominalis* Townsend (p. 23)
 Abdomen distinctly reddish at sides; intermediate segments
 thinly grayish pollinose beyond the narrow bases, the outer
 hind corners of each broadly shining; palpi black or yellow
 at tips (British Columbia)..... *occidentis*, new species (p. 22)
11. Thoracic stripes broadly separated by pollinose bands..... 12
 Thoracic stripes more or less fused, appearing as two broad
 black bands to the naked eye; intermediate abdominal seg-
 ments covered with thin uniform bluish-gray pollen except on
 narrow hind edge of each; palpi black on basal half, tips
 yellow (Mexico)..... *latevittata* van der Wulp (p. 36)
12. Abdomen broadly reddish on sides..... 13
 Sides of abdomen almost wholly black; fourth segment bright
 orange-yellow, destitute of pollen and shining on apical three-
 fourths; front prominent below; face strongly receding (Man-
 itoba, Canada)..... *borealis*, new species (p. 27)
13. Vibrissae distinctly above front edge of mouth; hairs on back of
 head tinged with yellow above; parafacials rather thickly
 haired; abdomen subshining, thinly gray pollinose, second
 segment invariably without any median marginals; robust
 species, length 10 to 14 mm. (New England to Mexico).
datanae Townsend (p. 29)
 Vibrissae on level with front edge of mouth; hairs on back of
 head wholly pale-gray; parafacials sparsely haired; abdomen
 thickly gray pollinose on basal half or more of last three
 segments; length 6 to 8 mm. (New England to Iowa).
sinuata, new species (p. 25)
14. Front one-half or more the width of eye..... 15
 Front narrower..... 16
15. Parafrontals and face plumbeous; cheeks blackish, subshining,
 very thinly gray pollinose; abdominal hairs erect or suberect;
 palpi largely black (Mexico)..... *ignobilis* van der Wulp (p. 16)
 Parafrontals pale grayish yellow; face and cheeks densely gray
 pollinose; abdominal hairs wholly depressed; palpi yellow
 (New Mexico)..... *duplicata*, new species (p. 17)
16. Outer genital forceps tapering outward to blunt rounded tips..... 17
 Outer forceps hardly at all narrowed apically, the tips subtrun-
 cate; parafrontals pale grayish yellow; mid tibiae with two
 bristles on outer front side near middle (Texas).
texana, new species (p. 19)

17. Cheek in profile almost linear; front greatly narrowed above 0.16 of the head width; parafacials inconspicuously haired; first and second abdominal segments usually without median marginals; mid tibiae with one bristle on outer front side near middle; abdominal hairs fine and depressed (North America, widespread)----- *rufopicta* Bigot (p. 31)
- Check in profile at least one-eighth the eye height; front approximating one-half the eye width; parafacials thickly haired; mid tibiae usually with two bristles on outer front side; abdominal hairs rather coarse and often erect or suberect (Europe, New England to New Mexico, and Washington)----- *quadripustulata* Fabricius (p. 14)
18. Intermediate joints of front tarsi conspicuously flattened and much broader than long----- 19
- Front tarsi ordinary----- 20
19. Palpi black; front exceeding one-half the width of eye; abdominal segments two and three with defined pollinose cross bands on basal half, the remainder shining black (Central and South America)----- *signata*, new species (p. 51)
- Palpi yellow; front greatly narrowed above and distinctly less than one-half the width of eye; intermediate abdominal segments pollinose or subpollinose to the hind margins (Georgia, Cuba)----- *okefenokeensis* Smith (p. 52)
20. Outer genital forceps subacute at apex or terminating in a curved hook----- 21
- Outer forceps truncate or symmetrically rounded at apex----- 23
21. Ocellar bristles present----- 22
- Ocellars absent; inner and outer genital forceps equal in length; the latter often with numerous long black hairs on outer side (Central and South America)----- *mima*, new species (p. 37)
22. Outer genital forceps tapering from base to tip; abdomen with the patches of matted hairs confined to the venter of third segment (Arizona)----- *montana*, new species (p. 36)
- Outer forceps narrowest at middle, the anterior extremity broadly produced; the patches of matted hairs on venter of third abdominal segment extending without interruption on base of fourth (Argentina)----- *singularis*, new species (p. 38)
23. Orbital bristles absent, claws and pulvilli elongate----- 24
- Orbitals present; claws and pulvilli minute (Mexico, Central and South America)----- *xanthocera* Wiedemann (p. 44)
24. Frontals in single rows with only fine hairs and small bristles outside--- 25
- Frontal bristles bordered by a partial secondary row outside of the main rows below (Bolivia)----- *analís* Macquart (p. 47)
25. Uppermost frontal bristles stout, reclinate, situated almost on line with anterior ocellus----- 26
- Uppermost frontals small, situated at or before apex of ocellar triangle----- 27
26. Thoracic stripes fused, appearing as two broad black bands; face pale grayish-white (Mexico, Central and South America)----- *pinguis* Fabricius (p. 49)
- Thoracic stripes broad and very distinctly separated on entire length; face grayish yellow pollinose (Cuba)---- *sexualis* Curran (p. 47)

27. Abdomen pollinose or subpollinose to hind margins of intermediate segments----- 28
 Abdomen with alternating white and black cross bands on last three segments; inner forceps narrow at base, uniform in width almost to the deeply incised apex, in profile thicker than usual and strongly bowed (Canal Zone)-- tricolor van der Wulp (p. 42)
28. Inner genital forceps very slender and but feebly keeled near base behind; outer forceps nearly equal the length of inner ones (North, Central, and South America).

intermedia, new species (p. 41)

Inner forceps of ordinary width and sharply keeled behind on basal two-thirds; outer forceps about one-half the length of inner pair, triangular (Texas)----- imitator, new species (p. 39)

FEMALES

1. Scutellum with three lateral bristles----- 3
 Scutellum with only two lateral bristles----- 2
2. Parafrontals and face plumbeous; abdominal hairs erect; third antennal joint three times the length of second (California, New Mexico)----- antennalis Coquillett (p. 10)
 Parafrontals and face covered with thick brassy or yellowish gray pollen; abdominal hairs depressed; third antennal joint one and one-half times as long as second (British Columbia).
intonsa, new species (p. 28)
3. Prosternum with only fine hairs at sides----- 4
 Prosternum bearing one or more bristles on either side; abdomen largely reddish (North America, widespread).
deilephilae Osten Sacken (p. 33)
4. Apical joint of fore tarsi ordinary----- 8
 Apical joint of fore tarsi elongated or distinctly bulged on sides----- 5
5. Tibiae and femora black----- 6
 Tibiae broadly red at middle, femora largely so; parafacial almost linear below; last joint of fore tarsi distinctly shorter than the combined length of two preceding ones (Brazil).
bicolor, new species (p. 46)
6. Abdomen with well-defined pollinose cross bands, segments 2 and 3 shining on broad apices----- 7
 Pollen on abdomen not in defined cross bands, the intermediate segments at least subpollinose to the hind margins; last joint of front tarsi hardly longer than normal; the black thoracic stripes separated and distinct on entire length (Georgia, Cuba)----- okefenokeensis Smith (p. 52)
7. Apical joint of fore tarsi greatly elongated approximating or exceeding the combined length of two preceding joints; third antennal joint black; abdomen gray pollinose (Mexico, Central and South America)----- pinguis Frbricius (p. 40)
 Apical joint of fore tarsi much shorter than two preceding joints; antennae entirely reddish; pollen on abdomen tinged with yellow (Mexico, Central and South America).
xanthocera Wiedemann (p. 44)

8. Apex of scutellum red----- 9
 Scutellum and abdomen wholly black, the latter highly polished
 except on narrow bases of segments 2 and 3 (Ohio).
polita, new species (p. 21)
9. Abdominal hairs long and erect----- 10
 Abdominal hairs depressed or if partially erect distinctly less
 than one-half the length of marginal macrochaetae----- 11
10. Tibiae pale yellow; third antennal joint black, fully three times
 as long as second (? Massachusetts)----- *tibialis*, new species (p. 11)
 Tibiae blackish; third antennal joint reddish, one and one-third
 times the length of second (North America)-- *fumiferanae* Tothill (p. 12)
11. Parafrontals golden----- 12
 Parafrontals cinereous or pale grayish yellow----- 15
12. Hind tibiae evenly ciliated at most with one or two longer
 bristles----- 13
 Hind tibiae with a row of wide-spaced uneven bristles on outer
 posterior edge; abdomen slender, segments 2 and 3 pruinose
 on basal third and shining black on broad apices (Maine).
vesiculata Townsend (p. 20)
13. Abdomen gray pollinose----- 14
 Last three abdominal segments golden pollinose on narrow base
 of each, this color fading to pale yellow and gray apically;
 antennae black, third joint fully three times the width of
 parafacial below (British Columbia)---- *occidentis*, new species (p. 22)
14. Antennae red; palpi thickened apically; parafacials moderately
 haired; mid tibiae usually with one large and one or more
 smaller bristles near middle on outer front side; length 10 to
 12 mm. (New England to Mexico)----- *datanae* Townsend (p. 29)
 Third antennal joint blackish; palpi slender to tip; parafacials
 inconspicuously haired; mid tibiae with a single stout bristle
 on outer front side near middle; length about 8 mm. (Mary-
 land, Indiana)----- *sinuata*, new species (p. 25)
15. Sides of abdomen obviously reddish----- 16
 Sides of abdomen black, posterior half of intermediate seg-
 ments shining black; third antennal joint three to four times
 as long as second; the black thoracic stripes broad and very
 distinct; length about 12 mm. (Canal Zone)- *tricolor* van der Wulp (p. 42)
16. Arista of ordinary length thickened on proximal fourth or more----- 17
 Arista slender to base and uncommonly long; third antennal
 joint broad to apex, fully twice as long as the second; para-
 facials bearing only a few inconspicuous hairs; hind tibiae
 sparsely ciliate with one stouter near middle (Texas).
intermedia, new species (p. 41)
17. Cheek in profile at least one-eighth the eye height; first abdomi-
 nal segment usually with a pair of median marginal bristles;
 mid tibiae with two or more bristles on outer front side near
 middle; parafacials moderately to densely haired (Europe,
 New England)----- *quadripustulata* Fabricius (p. 14)
 Cheek in profile almost linear; first abdominal segment without
 median marginals; mid tibiae with a single stout bristle near
 middle on outer front side; parafacials usually very incon-
 spicuously haired (North America, widespread)-- *rufopicta* Bigot (p. 31)

(1) *WINTHEMIA ANTENNALIS* Coquillett

Winthemia antennalis COQUILLET, Proc. U. S. Nat. Mus., vol. 25, p. 115, 1902.—

TOTHILL, Can. Ent., vol. 44, pp. 1-2, 1912.

Winthemia nigrifacies BIGOT, Coquillett, Revis. Tachin., p. 125, 1897 (not Bigot).

Scutellum bearing only two lateral bristles; face and front plumbeous; abdominal hairs erect; ocellars weak or absent.

Male.—Front (before vertex) 0.286 of the head width in the one specimen; parafrontals subshining black faintly pruinose below, thickly clothed with long black hairs; median stripe brownish black, at antennae wider than one parafrontal but greatly narrowed toward triangle; inner verticals of moderate length, outer ones vestigial; no ocellars or orbitals; uppermost two frontals reclinate, stronger than the preceding ones but not very long, the lower bristles hardly on level with apex of second antennal joint; parafacial not much narrowed downward, thickly clothed with black hairs, which extend close to the eye border; facial ridges bare except a few hairs next to vibrissae, which are situated on oral margin; antennae black, third joint three times the length of second; arista also black, thickened on basal fourth, penultimate joint only slightly longer than wide; cheek in profile about one-seventh the eye height, destitute of pollen, black and clothed with short fine hairs; palpi slender, black at base brownish yellow on tips, beset with numerous black hairs; eyes densely pale-haired.

Thorax black, subshining, lightly dusted with pale-gray pollen; mesonotum with five narrow black stripes before suture and becoming indistinct behind; scutellum obscurely reddish at apex, in some angles apparently shining but pruinose in a flat rear view; calypters white, the rims tinged with yellow.

Abdomen black with a red color apparent on sides; segments 2 to 4 sprinkled with thin bluish-gray pollen, which extends nearly to the hind margins on segments 2 and 3; a median dark stripe and changeable blackish spots visible in most views on the intermediate segments; first segment without median marginals; second with a weak pair scarcely larger than the surrounding hairs; third bearing a marginal row of about 10 bristles; fourth with irregular placed discals and a marginal row of weaker bristles; venter without any defined patches of dense hairs on either third or fourth segments; inner genital forceps united and keeled behind, rather broad at base tapering to apex, which is shallowly notched; outer forceps nearly as long as inner ones, emarginate shortly before apex on the hind side, yellow.

Legs black; hind tibiae ciliate with one slightly longer bristle in the row; mid tibiae with one stout anterior bristle near the middle; claws and pulvilli elongate.

Wings hyaline; third vein with one hair at base; fourth vein with an oblique bend, beyond straight to costa; first posterior cell open well before wing tip.

Female.—Front 0.287 and 0.327 of the head width in two specimens, more densely pollinose than in male; the usual two pairs of orbitals present; uppermost three or four frontals reclinate; ocellars present but poorly developed; outer verticals about one-half as long as inner pair; palpi thickened apically; claws and pulvilli short.

Length, 6 to 8 mm.

Type.—Female, U.S.N.M. No. 6222, from Los Angeles County, Calif.

Redescribed from the following, all in the United States National Museum: 1 female, Dripping Springs, N. Mex. (T. D. A. Cockerell); 1 female (type), Los Angeles County, Calif., July (D. W. Coquillett); and 1 male, Summit, Mount Lowe, Calif., July 4, 1917 (J. M. Aldrich).

The species varies in the development of ocellar bristles. The type female has a weak or hairlike pair of ocellars; in the second female they are hardly distinguishable from the adjacent hairs, while the single male specimen shows none at all.

(2) WINTHEMIA TIBIALIS, new species

Abdomen densely gray pollinose, the hairs long and erect on dorsum of intermediate segments; tibiae yellow, the middle pair with two stout bristles on outer front side near middle; thoracic stripes indistinct.

Male.—Front (at vertex) 0.316 of the head width in the one specimen, widening rather slowly to base of antennae; parafrontals gray pollinose, covered with long black hairs; median stripe reddish brown, hardly narrowed upward, at antennae almost as wide as one parafrontal; verticals one pair (inner) developed; orbitals none; ocellars large, directed forward and outward; frontal rows strongly divergent beneath antennae, extending to base of third joint, the uppermost bristles not reduced in size, reclinate; sides of face gray pollinose, narrowed downward, bearing a few rather inconspicuous hairs, which extend from the lower frontals to about the middle along the inner margins; antennae black, almost reaching oral margin, third joint nearly four times the length of second; arista of moderate length, thickened on basal third, penultimate joint short; vibrissae on oral margin, the ridges with a few bristles above; palpi yellow; cheeks gray pollinose, clothed with long fine black hairs, in profile about one-sixth the eye height.

Thorax black, gray pollinose, with a rather noticeable yellow spot above wing base, which extends backward to include the pos-

terior callus; scutellum pale yellow, bearing three lateral, one discal, and one larger than usual decussate apical pair of bristles, hairs on disk long and erect; calypters opaque, white.

Abdomen nearly as broad as long, black in ground color, the sides obscurely reddish; last three segments with thick gray pollen extending well to the hind margins; first segment without median marginals; second with two large pairs; third with a marginal row; fourth entirely covered with long bristly hairs; no defined patches of hairs on venter. The genitalia have been dissected from the single specimen and now are apparently lost.

Legs except tibiae black; hind tibiae bearing a row of uneven bristles on the posterior edge; claws and pulvilli elongate.

Wings hyaline; first posterior cell open considerably before wing tip; third vein with three or four hairs at base; costal spine not developed.

Female.—Front 0.351 of the head width (head somewhat shrunken in the one specimen); the usual orbitals present; verticals two pairs; claws and pulvilli short; in other details very similar to male.

Length, 10.5 mm.

Type.—Female, U.S.N.M. No. 43339.

Described from 2 specimens in the United States National Museum: 1 female labeled 3101 G, May 16, 1910; and 1 male, 3101 G, May 13, 1910, with an additional Townsend dissection label TD4764. Presumably, both specimens are from Massachusetts.

(3) WINTHEMIA FUMIFERANAE Tothill

Winthemia fumiferanae TOTHILL, Can. Ent., vol. 44, pp. 2-3, 1912; Can. Ent., vol. 45, pp. 74-75, 1913.—WALTON, Proc. Ent. Soc. Washington, vol. 15, p. 25, 1925.—JOHNSON, List, p. 203, 1925.—ESSIG, Insects West. North Amer., p. 584, 1926.—ALDRICH, Bull. Brooklyn Ent. Soc., vol. 22, p. 24, 1927.—WEST, New York State List, p. 817, 1928.

Nemosturmia pilosa TOWNSEND, Ins. Insc. Menst., vol. 14, p. 35, 1926.

Male.—Front greatly narrowed above, widening rapidly from about the middle to base of antennae, at narrowest 0.127 of the head width (average of four: 0.15; 0.12; 0.11; 0.13); parafrontals gray pollinose blackish near vertex, clothed with fine black hairs; median stripe reddish brown, triangular, at antennae wider than one parafrontal; frontals about 14 in number, the uppermost moderately strong, reclinate, the preceding ones decussate to antennae, extending about to the middle of second antennal joint; orbitals none; outer verticals not strong, about one-half as long as the inner pair; ocellars long, proclinate; parafacials gray pollinose, hardly at all narrowed downward, thickly clothed with hairs to or below middle except near eyes; antennae red more or less infuscated, third joint about one and one-fourth times the length of second; arista red, thickened on proximal

third, slender and darker in color beyond, basal joints short; palpi yellow, bearing a few long hairs on lower edge; cheek in profile about one-sixth the eye height, thinly gray pollinose on red ground color and thickly covered with black hairs; beard white, rather bushy.

Thorax black, thinly gray pollinose; dorsum marked with five narrow black stripes, which are sometimes very indistinct behind the suture; scutellum red, lightly dusted with white pollen. Chaetotaxy: Acrostichal, 3, 3; dorsocentral, 3, 4; humeral, 5; posthumeral, 2; presutural, 2; intraalar, 3 (none near suture); supraalar, 3; postalar, 2 or 3; pteropleural, 1 (small); sternopleural, 2, 1; scutellum with 3 lateral, 1 discal, and 1 decussate apical pair, the latter about as large as the median lateral; calypters semitransparent, white.

Abdomen rather pointed at apex, black with the sides tinged with red, subshining; the gray pollen on last three segments interrupted by a narrow dark stripe expanding to a roundish spot on the second segment; hairs rather fine, long, and erect; first two segments each with a pair of long median marginals; third with a marginal row of 12 to 14, large; fourth entirely covered above with erect bristles becoming weaker toward the apex; venter without defined patches of hairs; inner genital forceps feebly keeled near base behind, hardly at all tapering outward, the apex suddenly narrowed to an acute curved beak; outer forceps yellow, slightly longer than the inner, tapering to apical fourth thence expanded with the tips broadly rounded, the outer sides thickly pilose; fifth sternite blackish, with a broad deep V-shaped incision, the lobes bearing a few long fine black hairs.

Legs black; mid tibiae with two or three stout bristles on outer front side; hind tibiae ciliate, usually with one, sometimes two, longer bristles in the row; claws and pulvilli elongate.

Wings grayish hyaline tinged with brown at base; fourth vein with a sudden oblique bend curving inward shortly beyond, thence straight, reaching costa well before wing tip; third vein with two to four hairs at base; costal spine minute.

Female.—Front at vertex 0.335 of the head width (average of four: 0.36; 0.34; 0.32; 0.32), widening gradually to base of antennae; median stripe broad to triangle; inner and outer verticals strong; orbitals two pairs; sides of face distinctly narrowed downward; antennae red, third joint more than twice the width of parafacial at narrowest part; abdomen broader than in male and usually with less red color on sides, the hairs are coarse, often bristlelike along the median line; hind tibiae with a row of uneven bristles on outer edge; claws and pulvilli minute.

Length, 6.5 to 12 mm.

Type.—In the Canadian National Collection, from Duncan, British Columbia.

Redescribed from 40 specimens of both sexes. In the United States National Museum: 2 cotypes (male and female) reared from *Tortrix fumiferanae*, July 11-15, 1911, Duncan, British Columbia. From the following localities 18 males and 16 females: Oregon (A. L. Lovett); British Columbia (H. G. Dyar); Idaho (J. M. Aldrich); South Dakota (J. M. Aldrich); North Carolina (C. V. Riley, Franklin Sherman); Virginia (W. L. McAtee); Maryland (W. R. Walton); and Maine (C. W. Johnson). In Professor Hine's collection: 1 female from Loudonville, Ohio, June 6, 1915 (J. S. Hine). In my collection: 2 males from Crawford County, Ark., April 4, 1927 (D. G. Hall); and 1 female from Sugar Grove, Ohio, June 10, 1914 (H. J. Reinhard).

The species is closely related to *amoena* of Europe and may even be the same, in which case the latter name will replace the one here used. I have not seen any specimens of *amoena*. Until the type is examined, it appears expedient to consider the two forms as distinct.

(4) *WINTHEMIA QUADRIPUSTULATA* Fabricius

Musca quadripustulata FABRICIUS, Ent. Syst., vol. 4, p. 324, 1794.

Tachina quadripustulata FABRICIUS, Systl., p. 309, 1805.

Tachina variegata MEIGEN, Syst. Besch., vol. 4, p. 205, 1824.

Chactolyga rufonotata BIGOT, Annales, p. 257, 1888.—BRAUER and BERGENSTAMM, Sitzungsbr. Kais. Mus., vol. 106, p. 349, 1897.

Winthemia quadripustulata FABRICIUS, Coquillett, Revis. Tachin., p. 125, 1897, a complex of several species. The numerous references in recent literature are subject to verification.

Winthemia illinoensis ROBERTSON, Can. Ent., vol. 33, p. 286, 1891.

Winthemia rufonotata BIGOT, Aldrich, Catalogue, p. 474, 1905.

Coquillett first identified the species from North America by comparison with European specimens received from Zeller. The latter specimens are still preserved in the National Museum and are the true *quadripustulata*, according to later determinations of European material by Nielson and Villeneuve. It is impossible to decide whether Coquillett had the correct American form associated in making his original identification, but later in his Revision of 1897 he did include no less than four apparently distinct species. Since that time *quadripustulata* has been generally considered in this complex sense, and our literature is replete with references to confused species under this name.

I have examined one type specimen (male) of *illinoensis*, but have been unable to find any structural characters to separate it. The type has sparse, rather long, erect abdominal hairs. This combination of characters, according to the original description, applies to the male sex only. Since there are intergrading forms in the material examined, the species can not be considered as distinct.

Male.—Front before ocelli 0.2 of the head width (average of five: 0.19; 0.18; 0.2; 0.22; 0.21), rather protuberant below; parafrontals covered with cinereous pollen, becoming thinner and blackish before vertex, thickly black-haired; median stripe wine-red; a little narrowed upward and wider than one parafrontal at triangle; ocellars of moderate size, directed forward but not much outward; orbitals none; verticals two pairs, outer ones smaller and often hairlike; frontal bristles 10 to 14 in number, extending to level with apex of second antennal joint, directed inward, reduced in size above and stopping before or at ocellar triangle; antennae black, third joint usually reddish near base on inner side, about one and one-half times as long as second; arista blackish, somewhat longer than antennae, thickened almost to middle, penultimate joint as broad as long; face gray pollinose, the sides moderately to thickly haired, at narrowest part about equal to the width of third antennal joint; vibrissae situated above the front border of mouth; cheeks red in ground color gray pollinose, thickly clothed with longish black hairs, in profile about one-sixth the eye height; palpi yellow, frequently infuscated basally, beset with numerous black hairs; back of head densely pale-haired.

Thorax black, gray pollinose, marked with five opaque black stripes, often poorly defined, and the thinner median one sometimes obliterated in front of suture; scutellum red, covered with uniform thin gray pollen; calypters opaque, white.

Abdomen black in ground color, the sides more or less tinged with red, this color on intermediate segments somewhat obscured by thick gray pollen, which is interrupted at middle by a large roundish spot on second and a narrow dark stripe on third; fourth segment reddish-yellowish on apical half or more, the gray pollen on base with a constant opaque black median spot and two longitudinal reflecting stripes on either side, which change from light to dark as the angle changes; hairs erect or suberect, not very dense; first segment either with or without one pair of median marginal bristles; second rarely without any, usually with one pair and sometimes with a complete marginal row; third with a marginal row of 10 to 14, large; fourth bearing several irregular rows beyond middle with erect bristly hairs in front; venter with no defined patches of dense hairs; genital segments yellowish, small and retracted; inner forceps of moderate length, keeled behind on basal two-thirds, thence flattened and sloping to the incised apex; outer forceps yellow, tapering outward to rounded tips, clothed with fine pale hairs on outer side, about three-fourths as long as inner pair; fifth sternite deeply incised, the lobes yellow, bearing a few slender black hairs.

Legs black; mid tibiae usually with one stout and one or more smaller bristles (sometimes only one large) on outer front side near middle; hind tibiae thickly ciliate with or without one longer bristle in the row; claws and pulvilli elongate.

Wings grayish hyaline with a brown tinge at base; fourth vein with a sudden oblique bend curving inward beyond reaching costa well before wing tip; third vein with one or two hairs at base; costal spine minute.

Female.—Front 0.313 of the head width (average of three), gray pollinose with a perceptible yellowish tinge; face and cheeks cinereous; the usual two pairs of orbitals present; inner verticals strong, outer ones only slightly smaller, curving outward; wing shorter and broader apically than in male; third antennal joint wider than parafacial below; claws and pulvilli short.

Length, 7 to 10.5 mm.

Redescribed from 39 specimens including several (both sexes) from Europe determined by Dr. J. Villeneuve. Distribution: New Hampshire (C. H. T. Townsend, Mrs. A. T. Slosson); Indiana, North Dakota, Idaho, Oregon, Washington (J. M. Aldrich); Illinois (Charles Robertson, W. A. Nason); Wisconsin, no collector's label; New Mexico, 6,500 and 7,000 feet (C. H. T. Townsend).

(5) *WINTHEMIA IGNOBILIS* van der Wulp

Exorista ignobilis VAN DER WULP, Biologia Dipt., vol. 2, p. 71, 1890.

The type, a male specimen from Amula, Guerrero, Mexico, is in the British Museum. I have not seen it, but determine the species from notes taken on the type specimen by Dr. J. M. Aldrich in 1929. The female sex is unknown to me.

Male.—Front moderately broad, before ocelli 0.233 of the head width (average of three: 0.25; 0.22; 0.23), rather protuberant below; parafrontals with plumbeous pollen becoming thinner upward and almost shining black before vertex, thickly clothed with longish upright hairs; median stripe blackish, wider than one parafrontal at antennae; verticals two pairs, the outer about three-fourths as long as inner ones; orbitals none; ocellar bristles well developed; frontal bristles 12 to 14 in number, reduced in size above and stopping before triangle, the lowermost nearly on level with apex of second antennal joint; face plumbeous pollinose, the sides moderately broad and thickly hairy; antennae black, second joint three-fifths as long as third; arista black, longer than antennae, thickened on basal two-fifths, penultimate joint slightly longer than wide; vibrissae situated a little above the front edge of mouth; palpi wholly black or yellow apically, rather slender, beset with numerous black hairs; cheeks black and subshining but with thin pollen apparent in certain views,

thickly black-haired, in profile about one-eighth the eye height, beard white.

Thorax black, thinly gray pollinose, marked with five opaque black stripes, the median one very thin but continuing before the suture, outer ones broad and not interrupted at suture, and separated by pollen bands of about equal width; scutellum red beyond narrow base, almost destitute of any pollen; calypters semitransparent, white with the rims faintly yellow.

Abdomen black in ground color, the sides more or less reddish; intermediate segments covered with gray pollen interrupted by a large roundish black spot on second and an elongated smaller spot on third; fourth segment largely reddish, with the pollen on basal margin showing a changeable spot on either side of the constant dark median one; hairs on intermediate segments erect or suberect; first segment without median marginals; second with a well-developed pair; third bearing a marginal row of about 10; fourth with several irregular rows near the apex and erect hairs in front; venter without any defined patches of dense hairs; genitalia as in *duplicata*, but the inner forceps more deeply incised at the apex.

Legs black; mid tibiae with one large median bristle (two in one specimen) on outer front side near middle; hind tibiae ciliate with or without a longer bristle in the row near middle; claws and pulvilli elongate.

Wings hyaline, yellowish near base; no costal spine; third vein with one or two hairs at base.

Length, 8 to 9.5 mm.

Redescribed from 3 male specimens in the National Museum from South America, as follows: 1, Angol, Chile, December 27, 1926, no collector's label; 1, Perales, Chile, September 23 (A. Faz); and 1, Piscicultura, Bariloche, Argentina, October 30, 1926 (Shannon).

(6) WINTHEMIA DUPLICATA, new species

Male.—Front at vertex 0.236 of the head width (average of three: 0.25; 0.23; 0.23), prominent below, widening rapidly beyond middle to base of antennae; median stripe wine red, not much narrowed upward, at antennae about equal the width of one parafrontal; the latter densely pale grayish-yellow pollinose except at vertex and thickly clothed with black hairs outside of frontal rows; inner verticals moderately developed, outer ones weak or hairlike; orbitals absent; ocellar pair of good size, proclinate but not much divergent; frontal bristles about 12 in number directed inward, extending below middle of second antennal joint, the uppermost reduced to hairs well before the ocellar triangle; face gray pollinose the sides more silvery, rather broad, bearing longish black hairs on the inner margin;

vibrissae well above the front edge of mouth; palpi yellow, rather strongly bowed, beset with black hairs, which are longer on lower edge; antennae reddish, third joint more or less infuscated, about twice as long as second and distinctly narrower than one parafacial; arista hardly as long as antennae, reddish and thickened on proximal third, penultimate joint about as broad as long; cheeks red in ground color, bluish-white pollinose, thickly haired, in profile about one-seventh the eye height.

Thorax black, subshining, thinly dusted with white pollen, which has a distinct bluish sheen; mesonotum marked with narrow black stripes, which are indistinctly visible when viewed from behind; scutellum red except on narrow base, thinly covered with blue-white pollen; calypters opaque, white, the rims tinged with yellow.

Abdomen broadly red on sides with a wide black median stripe produced laterally on the hind margins of segments 2 and 3 and expanding on the first including all but the posterior half at sides; last three segments except the red apex of fourth covered with thin bluish-white pollen interrupted by a narrow median vitta and the usual dark reflecting spots on base of fourth; first two segments without median marginal bristles; third with a marginal row of 10 to 14; fourth with an apical row and covered with erect bristly hairs in front; hairs on intermediate segments depressed; venter without any defined patches of dense hairs; genital segments small, retracted; outer forceps yellow, more tapering and pointed than usual; inner ones with a shallow notch at the curved apex, sharply keeled behind on basal two-thirds and exceeding the outer pair by about one-fourth their length; fifth sternite broadly and deeply incised, yellow.

Legs slender, black, the tibiae obscurely yellow; front claws and pulvilli equal the combined length of last two tarsal joints; mid tibiae with one stout bristle on outer front side beyond middle; hind tibiae thickly ciliate.

Wings hyaline with a yellow tinge at base; venation ordinary; third vein with one or two hairs at base; costal spine none.

Length, 10 to 11 mm.

Female.—Unknown.

Type.—Male, U.S.N.M. No. 43340.

Described from 3 male specimens from Hell Canyon, N. Mex., Manzano National Forest, September 16-19, 1916, on foliage of *Quercus* sp. (C. H. T. Townsend).

The species resembles *ignobilis*, but in the latter form the pollen on the front and face is plumbeous; the region of the vertex black and subshining; hairs on intermediate abdominal segments more or less erect; median marginals on second segment; antennae wholly black, etc.

(7) WINTHEMIA TEXANA, new species

Male.—Front before triangle 0.175 and 0.2 of the head width in the two specimens, not very prominent below; parafrontals blackish above becoming densely gray pollinose downward, moderately beset with short hairs outside of frontal bristles; median stripe brownish black, exceeding the parafrontal width on entire length; verticals (inner pair) present moderately developed; frontals about 12 in number, directed inward and extending almost to apex of second antennal joint, the uppermost bristles smaller situated before the triangle; antennae hardly three-fourths as long as face, black, apex of second joint and base of third tinged with red, second joint three-fifths the length of third; arista shorter than antennae, thickened on basal fourth and very slender beyond, penultimate joint short; face cinereous pollinose, the sides narrow, clothed with longish black hairs; vibrissae slightly above the front edge of mouth; palpi yellow infuscated basally, slender, bearing numerous black hairs; cheeks gray pollinose, covered with fine hairs, in profile about one-seventh the eye height; back of head thickly pale pilose.

Thorax black, gray pollinose; mesonotum subshining showing five poorly defined black stripes when viewed from behind; scutellum red except on narrow basal margin, covered with uniform thin gray pollen; calypters opaque, white.

Abdomen broadly red on sides, this color beginning at middle of first segment and extending without interruption to the apex of the fourth, only a broad median dorsal and ventral stripe expanding on first segment black in ground color; last three segments with pale-yellow or grayish pollen, which on the intermediate segments is dense near base becoming thinner behind but extending almost to the posterior margin of each; fourth with the pollen confined to the basal half; a narrow dark median stripe present enlarged and forming a roundish spot on second segment; hairs except on anal segment depressed; no median marginal bristles on two basal segments; third with a marginal row of about 10; fourth with a marginal row and irregular placed bristles in front; venter sparsely and uniformly haired; inner genital forceps a little longer than usual, tapering uniformly from base outward to the moderately incised apex; outer forceps shorter than inner ones, not at all tapering outward, the tips broad or subtruncate, bearing numerous long black outwardly directed hairs on the sides; fifth sternite broadly and deeply incised, the inner margins of lobes blackish beset with long slender hairs.

Legs black; mid tibiae with two median anterior bristles; hind tibiae thickly and evenly ciliate; claws and pulvilli elongate.

Wings gray hyaline; venation as usual; third vein with one or two hairs at base; costal spine minute.

Length, 8.5 mm.

Female.—Unknown.

Type.—Male, U.S.N.M. No. 43580.

Described from two specimens taken at Menard, Tex., April and September, 1930, by H. E. Parish.

(8) *WINTHEMIA VESICULATA* Townsend

Trisisyrova vesiculata TOWNSEND, INS. INSC. MENST., vol. 4, p. 28, 1916.

Winthemia vesiculata TOWNSEND, JOHNSON, LIST, p. 203, 1925.

A rather slender shining black form, with the sides of the front densely yellow pollinose; apex of scutellum and abdomen reddish; abdominal segments 2 and 3 with whitish pollen on basal third to half, the hind margins shining black.

Front of female (vertex) 0.3 of the head width in the single specimen; face silvery pollinose, the sides with only a few hairs at middle none along border of eye; vibrissae on oral margin; antennae black, third joint reddish on inner posterior edge, broader than one parafacial and twice the length of second joint; palpi yellow; ocellars strong; orbitals two pairs, proclinate; verticals moderately developed; cheek in profile one-eighth the eye height.

Thorax narrower than usual; mesonotum shining black, lightly dusted with pale gray pollen, the dorsal stripes indistinct; scutellum sprinkled with grayish or white pollen becoming thinner toward base; calypters white tinged with yellow.

Abdomen slender, black, the sides and apex reddish; intermediate segments polished on about apical half but apparently subpollinose in a flat rear view; venter black, the narrow hind margin of the tergites pale yellow; first segment without median marginals; second with one large pair; third bearing a marginal row of about 10; fourth with a discal and a marginal row; hairs on segments 2 and 3 depressed.

Legs black; mid tibiae with one large and two small bristles near middle on outer front side; hind tibiae with a row of uneven bristles on the outer posterior edge; tarsal joints ordinary; claws and pulvilli short.

Wings hyaline; venation as usual; third vein with two hairs at base; costal spine minute.

Length, 9 mm.

Male.—Unknown.

Type.—Female, U.S.N.M. No. 19600.

Redescribed from the type specimen collected September 6, 1914, Sebago Lake, Me., by Dr. C. H. T. Townsend.

(9) WINTHEMIA POLITA, new species

Abdomen largely polished, the basal fifth of segments 2 and 3 bearing thin bluish-white pollen; closely related to *W. vesiculata*, but the scutellum and abdomen are entirely black.

Female.—Front 0.25 and 0.26 of the head width in the two specimens; parafrontals shining black before vertex, thinly pollinose downward, sparsely haired; median stripe reddish-brown, much wider than one parafrontal before triangle; inner and outer verticals developed but not very long; orbitals two pairs, proclinate; ocellars present; lowermost frontals below middle of second antennal joint, upper two bristles in each row reclinate; sides of face silvery, sparsely haired along inner margins to middle or a little below; vibrissae situated on oral margin; antennae black, third joint hardly twice the length of second; arista black, longer than antennae, thickened on proximal fourth and slender beyond, penultimate joint short; cheeks very narrow in profile about one-twelfth the eye height, thinly gray pollinose on red ground color; palpi yellow; back of head with scanty pale hairs.

Thorax shining black, sprinkled lightly with whitish pollen, humeri and pleura more densely pollinose; four narrow dark stripes faintly visible in front and entirely disappearing behind suture; scutellum black, lightly dusted with white pollen; calypters with the hind lobe brown on inner third, white outwardly and the margin faintly yellow, opaque; the front lobes wholly white, semitransparent.

Abdomen black; the hairs depressed; first segment without median marginals; second with one pair; third with a marginal row of about 8; fourth covered with erect bristly hairs and bearing a row of stronger bristles well before the apex; ovipositor tubular in form, thick and fleshy.

Legs black, knees reddish; hind tibiae subciliate with one longer bristle near the middle; middle tibiae with one large median anterior bristle; tarsi ordinary; claws and pulvilli minute.

Wings subhyaline with a brownish tinge near base and along costal margin; fourth vein with a rectangular bend, beyond evenly concave to costa; first posterior cell open well before wing tip; third vein with two hairs at base; no costal spine.

Length, 6.5 to 8 mm.

Male.—Unknown.

Type.—Female, U.S.N.M. No. 43341.

Described from 2 specimens: 1 in the United States National Museum labeled "1950 August 15, TD 356," no locality but supposed to be from Massachusetts; the other in my collection taken at Brownhelm, Ohio, August, 1920 (H. J. Reinhard).

(10) *WINTHEMIA OCCIDENTIS*, new species

Male.—Front (before ocelli) 0.18 of the head width (average of five: 0.19; 0.18; 0.18; 0.17; 0.18), widening rapidly beyond middle to base of antennae; parafrontals covered with golden pollen fading out upward becoming blackish and subshining before vertex, moderately haired outside of frontal rows; median stripe brownish black, wider than one parafrontal on its entire length; verticals one pair (inner), not very large; orbitals none; ocellars of ordinary size, directed forward, not at all divergent; frontals about 12 in number, extending opposite to apex of second antennal joint, uppermost bristles small, decussate, situated well before apex of ocellar triangle; face gray pollinose, the sides concolorous below and golden from the lowermost frontals upward, sparsely clothed with rather coarse black hairs except along the margins of the eyes; antennae black, third joint tinged with red near base on inner sides, less than twice the length of second, slender but distinctly wider than parafacial at narrowest; arista thickened and reddish on proximal third, black in color beyond, penultimate joint as broad as long; cheeks blackish and thinly gray pollinose, thickly beset with fine black hairs, in profile about one-eighth the eye height; palpi black or often the tips yellow, slender; back of head with a dense ruff of grayish-white hairs faintly tinged with yellow above.

Thorax black, lightly dusted with gray pollen, mesonotum shining except in a flat rear view, the stripes largely obliterated; scutellum reddish beyond basal third, faintly pruinose, bearing three lateral, one discal, and a good-sized decussate apical pair of bristles; calypters opaque, golden becoming paler toward middle.

Abdomen black, with the sides and narrow apex conspicuously reddish; last three segments broadly covered with pollen, which on the narrow base of each is almost golden, becoming paler or grayish apically; intermediate segments shining on posterior half at the sides and on the narrow apices above; fourth shining on apical third, the pollen on basal margin interrupted by a black changeable stripe on either side of a constant median one, which extends forward narrowly on the third segment thence expanding and broadly interrupting the pollen from apex to base on second segment; basal segment without median marginal bristles; second with or without one pair; third with a marginal row of about 10; fourth with several irregular rows on apical half; hairs on intermediate segments depressed; venter without any defined patches of dense hairs; genital segments reddish yellow, small and retracted.

Legs black; mid tibiae with one bristle near middle on outer front side; hind tibiae evenly ciliate; claws and pulvilli elongate.

Wings grayish hyaline tinged with brown near base; fourth vein with a rounded rectangular bend strongly curved inward beyond reaching costa about one-half the length of hind cross vein before exact wing tip; third vein with one or two hairs at base; costal spine minute.

Female.—Front at vertex 0.3 and 0.272 of the head width in two specimens; parafrontals golden pollinose to vertex; inner and outer verticals developed, the usual orbitals present; palpi thickened and yellow on apical half; cheeks and face densely pale-gray pollinose; parafacials distinctly narrowed downward, inconspicuously short-haired; thorax covered with thick gray pollen tinged with yellow on mesonotum, which is marked with four distinct narrow shining black stripes; last three abdominal segments pollinose on about basal half, the remainder shining, second segment bearing a pair of stout median marginal bristles, fourth with a marginal and a discal row slightly beyond the middle; hind tibiae ciliate with one longer bristle in the row near middle, claws and pulvilli short; otherwise as in male.

Length, 7.5 mm.

Type.—Male, in the American Museum of Natural History.

Described from 7 males and 2 females received from C. H. Curran, collected at Wigwam Inn, Burrard Inlet, British Columbia, June 3 to 10, 1930 (G. R. Hopping), reared from "Western Hemlock Looper."

The species is related to *W. abdominalis* from which it differs in having thinner and paler pollen on the last three abdominal segments and the hind margin of each more broadly shining; the intermediate segments conspicuously reddish at sides; less robust in build.

(11) WINTHEMIA ABDOMINALIS Townsend

Neowinthemia abdominalis TOWNSEND, Proc. U. S. Nat. Mus., vol. 56, p. 583, 1919.

Last three abdominal segments almost wholly covered with striking thick pale-golden pollen, which instantly distinguishes the species in the male sex. The female is unknown.

Male.—Front at narrowest part 0.17 to 0.21 of the head width (in three specimens), hardly widening to about the middle thence rapidly to base of antennae; parafrontals yellow pollinose becoming velvety black toward vertex, rather densely pilose; median stripe brownish black, before ocelli distinctly wider than one parafrontal; inner verticals moderately strong; ocellars present; orbitals none; frontal rows strongly divergent below antennae extending to level with apex of the second joint, the upper bristles reduced in size and stopping before the triangle; parafacials not much narrowed down-

ward, gray pollinose tinged with yellow on upper portion, clothed with black hairs except next to eyes (in the type the hairs are arranged in three almost regular rows); vibrissae somewhat approximated, rather short, on oral margin; antennae black, base of third and apex of second joints reddish; third joint rather slender, less than twice the length of second; arista black, slightly thickened near base and very slender beyond middle; cheeks about one-sixth the eye height, densely haired; palpi blackish at base becoming brownish or yellow toward the tips and beset with numerous black hairs.

Thorax black, humeri and pleura conspicuously pollinose, mesonotum shining but with thin brownish pollen apparent in a flat rear view, the dark stripes very indistinct even before the suture; scutellum reddish, lightly dusted with pale pollen, bearing the usual three lateral and one decussate apical pair of bristles besides a discal pair; calypters tawny.

Abdomen black with a red color apparent on sides; the pollen on last three segments interrupted by a narrow but distinct black median stripe, which expands to a roundish spot on basal half of the second segment above; first and second segments without median marginal bristles, third with a marginal row of about 10; fourth covered with smaller bristles which are irregularly placed; hairs on intermediate segments depressed; venter without defined patches of thick or matted hairs.

Legs black; mid tibiae with one bristle on the outer front side near middle; hind tibiae densely and evenly ciliated; claws and pulvilli distinctly elongated.

Wings hyaline; venation as usual; third vein with one or two hairs at base; costal spine minute.

Length, 11 to 12 mm.

Type.—Male, U.S.N.M. No. 22254, from Dixie Landing, Va.

Redescribed from 4 males, including the type: 1 from Dixie Landing, Va., July 21, 1914, on foliage (C. H. T. Townsend); 1, Rockville, Pa., July 11, 1915 (E. Daecke), collection J. M. Aldrich; 1 labeled 231 (W. R. Walton collection). In Professor Hine's collection there is one specimen from Hinckley, Medina County, Ohio, August 8, 1903 (J. S. Hine).

The species is barely distinct from the European *W. speciosa* Egger, which differs in having the parafacials a little more densely haired; the third antennal joint slightly broader and almost three times as long as the second. Having seen only one specimen of the latter species, I can not determine the extent of variation that may occur, and I consider it expedient to recognize the two forms as distinct for the present.

(12) WINTHEMIA SINUATA, new species

Sides of front yellow to golden pollinose, parafacials concolorous above often paler or wholly whitish, bearing only a few short hairs; mesonotum marked with five complete stripes; inner orbits sinuate in male.

Male.—Front moderately broad at vertex, slightly narrowed before triangle, thence widening rapidly to base of antennae, at narrowest part 0.242 of the head width (average of five: 0.24; 0.24; 0.23; 0.26; 0.24); median stripe reddish brown, occupying about one-third of the frontal width at triangle; verticals two pairs, rather small; ocellar bristles present; orbitals none; frontal bristles about 12 in number directed inward and extending to apex of second antennal joint, the uppermost hairlike and situated before apex of triangle; antennae three-fourths the length of face, black, the apex of second and base of third joint red, the latter less than twice as long as second joint; arista reddish, slightly thickened on basal two-fifths, penultimate joint short; vibrissae somewhat approximated, on level with oral margin; palpi yellow, beset with numerous black hairs; cheeks gray pollinose, clothed with fine short black hairs, about one-eighth the eye height.

Thorax black, gray pollinose; mesonotum with thinner pollen and marked with five shining black vittae; scutellum red beyond narrow base and covered with thin bluish-white pollen; postscutellum thinly pollinose; calypters opaque, white, the margins tinged with yellow.

Abdomen broadly red beginning with the first segment and extending continuously to apex of fourth, only a broad stripe in the middle black in ground color; intermediate segments gray pollinose nearly to hind margins; the pollen on fourth segment confined to basal half and interrupted by roundish spots which change from light to dark as the angle varies; first segment usually without median marginals; second with or without one pair; third bearing a marginal row of 10 to 12; fourth with several irregular rows near apex and erect bristly hairs in front; venter of third and fourth segments without any defined patches of matted hairs; inner genital forceps blackish, sharply keeled behind to apical third thence flattened and sloping forward to the divided apex; outer forceps yellow, triangular with the tips blunt or broadly rounded, clothed on outer side with numerous pale hairs; fifth sternite yellow, broadly and deeply incised.

Legs blackish; mid tibiae with one large anterior bristle near middle; hind tibiae ciliate with or without a longer bristle near middle; claws and pulvilli exceeding the length of last tarsal joint.

Wings subhyaline, with a faint yellow tinge near base and along costa; venation normal; third vein with one hair at base; costal spine vestigial.

Female.—Front at vertex 0.304 of the head width (average of five: 0.33; 0.29; 0.32; 0.3; 0.28), widening only slightly to base of antennae; parafrontals somewhat paler than in male, the yellow not extending below lowermost frontals; two pairs of proclinate orbitals present; face wholly white or silvery, the sides narrower than third antennal joint; hind tibiae sparsely ciliate with one longer bristle near middle; claws and pulvilli short.

Length, 7 to 9 mm.

Type.—U.S.N.M. No. 43342, from Plummers Island, Md.

Described from 42 male and 8 female specimens. In the United States National Museum: 1 male, Lick Brook, Ithaca, N. Y., August 12, 1928 (H. A. Scullen); 3 males, Sebago Lake, Me., September 6, 7, and 9, 1914 (C. H. T. Townsend); 1 male, Orono, Me., August 17, 1928 (O. A. Johannsen), "ex *Cingilia latenaria* Dru."; 1 male, Lake Metigoshe, Turtle Mountains, N. Dak., June 20, 1918 (J. M. Aldrich); 1 male, Mandan, N. Dak., June 16, 1918 (J. M. Aldrich); 1 male, Brookings, S. Dak., June 16, 1891 (J. M. Aldrich); 1 male, Big Stone City, S. Dak., June 8, 1918 (J. M. Aldrich); 3 males and 1 female, Lafayette, Ind., September 15, 1917, and July 16, 1915, a pair in copula (J. M. Aldrich); 2 males, Lawrence, Kans., without date (J. M. Aldrich); 1 male, Great Falls, Va., July 27, 1920 (C. T. Greene); 1 male, Chain Bridge, Va., July 1, 1923 (J. M. Aldrich); 1 male, Rosslyn, Va., June 25, 1913 (R. C. Shannon); 1 male, Inglebrook, Pa., May 28, 1911 (W. S. Fisher); 1 male and 1 female in copula, Beltsville, Md., September 2, 1917 (McDermott and Barber); 3 males, Plummers Island, Md., May 7 and July 11, 1909 (W. L. McAtee); and 1 male, Rock Creek, D. C., June 17, 1916 (G. E. Quinter). In the American Museum of Natural History: 3 males and 1 female, Tuxedo, N. Y., July 1, 23, and August 2, 1928 (C. H. Curran); 6 males and 2 females, Avon Old Farms, Avon, Conn., June 6 to 19, 1929 (C. H. Curran); 1 male, Salt Meadows, Newark, N. J., August (A. J. Weidt); 1 male, Atherton, Mo., June, without collector's label; 1 female, Saugus, Mass., September 5, 1914 (H. M. Parshley); and 1 male, labeled No. 379b, without locality. In the Illinois State Natural History Survey collection: 1 male, Antioch, Ill., August 1, 1924 (T. H. Frison); 1 male, Urbana, Ill., August 12, 1901 (E. G. Titus); and 1 female, without locality. In my collection: 3 males and 1 female, Brownhelm, Ohio, August 19, 1920 (H. J. Reinhard); 1 male, Sunfield, Mich., June 17, 1922 (L. G. Gentner); and 1 male, Ames, Iowa, July 19, 1929, "ex *Luperina stipata*" (G. C.

Decker). The last has been reported as *W. quadripustulata*, according to my determination, by Mr. Decker in Iowa Experiment Station Research Bulletin No. 125.

(13) WINTHEMIA BOREALIS, new species

Male.—Front at vertex 0.25 of the head width in the one specimen, rather prominent below; parafrontals golden pollinose to vertex, sparsely clothed with rather short black hairs below, which become longer and denser before vertex; median stripe brownish black, much narrower than one parafrontal on its entire length; verticals two pairs, the outer ones about the size of postocellars; no orbitals; ocellars broken off but the scars indicating bristles of the usual size; frontals about 14 in number, directed inward and extending to level with apex of second antennal joint, uppermost bristles small, situated about opposite the apex of triangle; face strongly receding, gray pollinose, the sides golden on upper three-fourths, rather thickly beset with longish black hairs; vibrissae on level with front edge of mouth; cheeks gray pollinose, black-haired, in profile about one-seventh the eye height; palpi yellow; antennae blackish, three-fourths the length of face, third joint less than twice as long as second; arista slightly thickened on proximal third, reddish, penultimate joint hardly longer than wide; beard grayish white, rather bushy.

Thorax black, thickly gray pollinose including the mesonotum, which is marked with five widely separated black stripes; scutellum reddish on apical half or more, gray pollinose, disk covered with rather long fine erect hairs; calypters opaque, white.

Abdomen with anal segment wholly bright orange-yellow, this color extending forward on the venter to middle of third segment, the remainder and the basal segments almost entirely black but faintly tinged with red on the sides; segments 2 and 3 largely covered with changeable bluish-gray pollen, which is rather dense on the narrow basal margin, becoming thinner behind but extending almost to the hind border of each; fourth segment shining, with gray pollen on basal fourth interrupted by reflecting spots, which change from light to dark as the angle varies; first segment with one pair of smallish median marginal bristles; second with two pairs and the third with a marginal row of about 14, all moderately stout; fourth with several irregular rows on apical half; hairs on intermediate segments rather coarse, long, and depressed; venter thickly long-haired but without any sharply defined patches; genital segments yellow, retracted; inner forceps tapering gradually from base to apex united and keeled behind as usual the tip moderately incised; outer forceps yellow, about three-fourths the length of inner ones, narrowed outwardly, the tips blunt or broadly rounded.

Legs rather stout, black, the knees reddish; mid tibiae with one large bristle near middle on outer front side; hind tibiae ciliate, the bristles not very closely placed, one near middle stouter and longer than the rest; claws and pulvilli as long as last two tarsal joints.

Wings grayish hyaline, slightly infuscated near base; venation as usual; third vein with one or two hairs near base; costal spine very minute.

Length, 10 mm.

Female.—Unknown.

Type.—In the American Museum of Natural History.

Described from one male received from C. H. Curran, collected at Transcona, Manitoba, Canada, June 24, 1924 (G. S. Brooks).

Although the genitalia are almost identical with those of *sinuata*, the species may be readily distinguished by the more prominent front and strongly receding face; the abdomen is darker on the sides and the fourth segment with a much narrower pollen band. There are other minor differences.

(14) *WINTHEMIA INTONSA*, new species

Female.—Front at vertex 0.3 of the head width (one specimen), rather prominent below, the sides thickly covered with dull pale-yellow pollen and bearing scattered fine short hairs; median stripe reddish, not much narrowed before triangle; verticals two pairs; ocellars and orbitals present; frontals descending to apex of second antennal joint, the uppermost two or three bristles in each row stout but not very long, reclinate; antennae reddish, third joint one and one-half times the length of the second; arista long, slender, with a short penultimate joint; sides of face dull pale yellow, thickly clothed with rather coarse black hairs, not much narrowed downward; vibrissae situated on lower edge of face; cheeks covered with dense grayish pollen, about one-eighth the eye height; palpi yellow; occiput thickly pale-haired.

Thorax black, gray pollinose, with four dark dorsal stripes and a median one apparent behind the suture in some views; scutellum reddish on apical half, gray pollinose, bearing only two lateral bristles besides a smaller decussate apical and a discal pair; calypsters opaque, white.

Abdomen black in ground color; the intermediate segments entirely covered with dense gray pollen; fourth segment wholly red, with reflecting changeable spots on the basal margin above; first segment without median marginals; second with one stout pair; third with a marginal row of about 12; fourth with irregular placed smaller discals and a marginal row; hairs on dorsum rather long and coarse but depressed.

Legs black; mid tibiae with one long bristle on front side near middle; hind tibiae with a row including two longer bristles on outer posterior edge; tarsi ordinary; claws and pulvilli shorter than last tarsal joint.

Wings hyaline; fourth vein curved inward beyond bend and reaching costa considerably before tip of wing; first posterior cell open; third vein with one hair at base; no costal spine.

Length, 9 mm.

Male.—Unknown.

Type.—Female, U.S.N.M. No. 43343.

Described from a single specimen collected at Kaslo, British Columbia, by R. P. Currie.

(15) WINTHEMIA DATANAE Townsend

Exorista datanae TOWNSEND, Trans. Amer. Ent. Soc., vol. 19, p. 288, 1892.

Winthemia quadripustulata (part) COQUILLET, Revis. Tachin., p. 125, 1897.—

ALDRICH, Catalogue, p. 474, 1905.

Although the type series, consisting of three male specimens, is apparently lost, the species can be recognized with hardly any doubt from the original description. It is robust in build like *cecropiae* but may be readily distinguished in the male sex by the narrower front and the elongated claws and pulvilli.

Front in male 0.192 of the head width (average of five: 0.18; 0.19; 0.17; 0.22; 0.2), rather prominent below; median stripe reddish brown, narrowed behind and extending on either side of triangle to vertex; parafrontals pale yellow to golden pollinose more or less blackish and subshining before vertex, thickly clothed with black hairs; face grayish to yellow pollinose, the sides usually more distinctly yellow, conspicuously black-haired; vibrissae situated somewhat above the front edge of mouth; cheeks blackish, thinly gray pollinose and subshining in certain views, thickly covered with short black hairs the lower marginal row of bristles weak, in profile about one-seventh the eye height; palpi yellow rather strongly bowed, bearing longish black hairs on lower edge; antennae blackish, first two joints and third near base on inner side tinged with red, the latter joint hardly twice the length of second; arista reddish, thickened on about proximal third, penultimate joint slightly longer than broad; frontal bristles extending to apex of second antennal joint, the uppermost hairlike and situated well before the triangle; ocellars present; orbitals none; inner verticals moderately developed, outer ones vestigial; back of head thickly clothed with whitish hairs usually tinged with yellow above.

Thorax black, subshining, lightly dusted with gray pollen; mesonotum marked with five narrow black stripes often poorly defined, the

outer ones interrupted at suture and the median one sometimes obsolete in front; scutellum red except on narrow base; sprinkled with bluish-white pollen, usually bearing three lateral bristles but sometimes with four besides the apical pair; calypters opaque, white tinged with yellow.

Abdomen subshining, usually broadly reddish on sides and apex; intermediate segments with rather thin gray pollen extending nearly to hind margins, the pollen on basal half of fourth interrupted by four blackish longitudinal stripes, which change from light to dark as the angle varies; a narrow dark median stripe visible in most views; basal segments invariably without any median marginal bristles; third with a marginal row of about 10 stout; fourth bearing several irregular rows of smaller bristles near the apex and entirely covered with erect hairs in front; the hairs on intermediate segments fine, short, and depressed; venter without defined patches of dense hairs.

Legs black; front claws and pulvilli equal the length of last two tarsal joints; mid tibiae with one large and usually one or two smaller bristles on outer front side near middle; hind tibiae thickly ciliate.

Wings subhyaline, the anterior portion often brownish; venation as usual; third vein with one or two hairs at base; costal spine vestigial.

Female.—Front 0.294 of the head width (average of five: 0.29; 0.30; 0.32; 0.28; 0.28); parafrontals yellow pollinose to vertex and sparsely haired outside of frontal rows; median stripe occupying about one-third the frontal width; two pairs of verticals and orbitals present; third antennal joint broader, thorax more densely pollinose and the abdominal hairs coarser than in male; second segment of abdomen with a stout pair of median marginals; hind tibiae with one or more longer bristles in the row on outer posterior edge; claws and pulvilli short.

Length, 9 to 13 mm.

Redescribed from numerous specimens of both sexes from New England, Ohio, Michigan, and Illinois. Two males from Trinidad, West Indies, and 6 from Sanchez, Chihuahua, Mexico, are apparently the same. Two specimens of the original type series were reared from *Datana* sp.

The species, as may be noted in the description, is variable, but I have been unable to find any constant characters to separate additional forms. The United States National Museum contains a series reared from one parent host that varies with respect to the number of bristles on the front side of the middle tibiae; while other occasional specimens with three sternopleurals or four lateral scutellar-

bristles agree with the other details mentioned in the original description. The genitalia are quite alike in structure and show no tangible characters.

(16) WINTHEMIA RUFOPICTA Bigot

Chaetolyga rufopicta BIGOT, Annales, p. 259, 1888.—BRAUER and BERGENSTAMM, Sitzungsber. Kais. Mus., vol. 106, p. 349, 1897.

Tricholyga fulvidapex BIGOT, Annales, p. 265, 1888.

Csactolyga fulvidapex BIGOT, Brauer and Bergenstamm, Sitzungsber. Kais. Mus., vol. 106, pp. 24, 352, 1897.

Mystacella tessellata VAN DER WULP, Biologia Dipt., vol. 2, p. 56, 1890.

Exorista ciliata TOWNSEND, Trans. Amer. Ent. Soc., vol. 18, p. 363, 1891.

Winthemia quadripustulata (part) COQUILLETT, Revis. Tachin., p. 125, 1897.—ALDRICH, Catalogue, p. 474, 1905.

Winthemia rufopicta BIGOT, Aldrich, Catalogue, p. 474, 1905.

This is perhaps the commonest species of the genus in North America. Coquillett misidentified it and listed the form as a synonym of *quadripustulata* in his Revision. This was accepted by most subsequent authors, and our literature now contains many confused records that can not be accepted without verification.

One of the striking characters of the species is the greatly narrowed front in the male sex. In 100 specimens selected at random the front at the narrowest part by micrometer measurements ranged from 0.12 to 0.18 of the head width; only 3 specimens exceeded 0.17; and 86 specimens were within the limits of 0.13 to 0.16. The cheeks in both sexes are uncommonly narrow in profile view.

Male.—Parafrontals blackish and subshining near vertex, densely gray pollinose downward, clothed with short black hairs thicker on either side of triangle; median stripe brownish or black, narrowed behind but wider than one parafrontal at triangle; inner verticals rather short, outer ones vestigial; orbitals none; frontals 10 to 12, directed inward and extending below middle of second antennal joint, uppermost bristles weak, situated considerably before triangle; the latter densely haired with a pair of short proclinate hardly divergent bristles; face and cheeks gray pollinose on red ground color; parafacial narrow, sparsely to moderately clothed with slender black hairs; antennae about two-thirds the length of face, black, third joint red near base on inner side, slender, one and one-half times as long as second; arista rather short, slightly thickened near base, penultimate joint usually as broad as long; vibrissae approximated and somewhat above the front edge of mouth; palpi yellow, black-haired to tips, cheek in profile almost linear, about one-fifteenth the eye height; beard white.

Thorax, black subshining, lightly dusted with gray pollen, marked with five narrow black stripes often indistinct; scutellum red except

en narrow base, covered with thin gray pollen; calypters opaque, white with a faint yellow tinge.

Abdomen broadly red on sides with a wide black median stripe expanding on first segment and including all but the posterior half at sides, anal segment often blackish near base but sometimes wholly reddish yellow; intermediate segments gray pollinose or subpollinose to the hind margins; fourth with denser gray pollen on basal half showing three elongated changeable spots as the angle varies, the median one extending forward interruptedly on segments 3 and 2; basal segments ordinarily without any median marginal bristles though sometimes a pair present on the second; third segment bearing a marginal row of 8 to 12 strong bristles; fourth covered with shorter ones on apical half; venter without defined patches of hairs; genital segments small and retracted; inner forceps united except at tip with a rather prominent sharp keel behind, in profile thick to middle thence sloping forward to the abruptly curved pointed and divided apex, bearing long black hairs directed upward and outward; outer forceps yellow, with numerous long brownish hairs on outer side, about three-fourths as long as inner ones, tips rounded or blunt; fifth sternite with a broad deep incision, the lobes bearing long black hairs along the inner margins.

Legs slender, black; mid tibiae with one large median anterior bristle; hind tibiae thickly ciliate rarely with one longer bristle in the row; claws and pulvilli elongate.

Wings grayish hyaline; fourth vein arcuate beyond bend reaching costa well before wing tip; no costal spine; third vein with one or two hairs at base.

Female.—Front at vertex 0.26 to 0.29 of the head width, not much wider at base of antennae; parafrontals gray pollinose to vertex, bearing only a few short scattered hairs; the usual orbitals present; inner and outer verticals developed; uppermost frontals stout, reclinate, but not very long; antennae red, third joint more or less infuscated, wider than parafacial at narrowest; the latter usually very inconspicuously haired; thorax densely gray pollinose, the dorsal stripes distinct; second abdominal segment bearing a pair of median marginal bristles; claws and pulvilli short; hind tibiae less thickly ciliated than in male with one larger bristle near the middle.

Length, 5 to 11 mm.

Type.—In the collection of J. E. Collin, Newmarket, England.

Redescribed from more than 200 specimens (both sexes), March to October, College Station, Tex. (H. J. Reinhard). Distribution records: Mississippi (F. M. Hull); Iowa, reared from *Papaipema nebris*, July 26 and 27, 1929 (G. C. Decker); Michigan (L. G.

Gentner); Illinois (W. A. Nason, T. R. Frison); Ohio (H. J. Reinhard); Massachusetts (H. E. Smith); Virginia (J. M. Aldrich); and Maryland (R. C. Shannon).

The species is a common parasite of the army worm. *Militaris* has also been reported from this host, and may prove to be the same, but I have not been able to locate the type; the original description is too inadequate to identify the form with certainty.

(17) WINTHEMIA DEILEPHILAE Osten Sacken

Tachina deilephilae OSTEN SACKEN, Can. Ent., vol. 19, p. 164, 1887.

Winthemia quadripustulata (part) COQUILLETT, Revis. Tachin., p. 125, 1897.—ALDRICH, Catalogue, p. 474, 1905.

This species, long submerged in synonymy, may be readily distinguished from all other known species by the presence of one or two slender bristles on each side of the prosternum. Sides of front and face grayish-white pollinose; abdomen red except a broad dark median stripe which expands in front and includes the basal margin of first segment; mid tibiae usually with two stout bristles on outer front side near middle.

Male.—Front (before ocelli) 0.237 of the head width (average of four: 0.25; 0.25; 0.23; 0.22), rather prominent below; parafrontals thickly covered with erect hairs near vertex, becoming thinner or scattered downward; median stripe red, at triangle fully twice the parafrontal width; verticals two pairs; orbitals none; ocellars well developed; frontal bristles about 10 in number directed inward, extending to middle of second antennal joint and stopping before triangle above, the uppermost one or two bristles smaller than the preceding ones; sides of face bearing a few inconspicuous hairs on inner margins, not unusually narrowed downward; vibrissae somewhat approximated about on oral margin but considerably above the lower edge of head; antennae red, third joint more or less infuscated, about twice as long as the second; arista rather short barely equaling the combined length of last two antennal joints, moderately thickened on proximal two-fifths; palpi yellow; cheeks gray pollinose on red ground color, in profile about one-ninth the eye height; beard white.

Thorax black, gray pollinose; mesonotum marked with five black stripes, the median one narrow but visible before suture in most views; scutellum red, rather densely gray pollinose; calypters opaque, white.

Abdomen largely red, covered with gray pollen devoid of any pattern, fourth segment with changeable spots on basal margin above; segments 1 and 2 without median marginal bristles; third with a marginal row of 8 to 10; fourth covered with erect

bristly hairs in front and bearing a row of stronger bristles before the apex; venter of third and fourth segments rather thickly pilose but the hairs not confined to patches with sharply limited margins; inner genital forceps united, keeled behind, hardly tapering to apical third thence rather sharply to apex which is bowed forward; outer forceps yellow, shorter, with broadly rounded tips.

Legs black; hind tibiae evenly ciliated; front claws and pulvilli equal the length of last two tarsal joints.

Wings hyaline; venation as usual; no costal spine; third vein with two or three hairs at base.

Female.—Front 0.35 of the head width (four measured); uppermost frontals moderately large, reclinate; orbitals two pairs; third antennal joint red, broader than in male; cheek about one-seventh the eye height; second abdominal segment with or without one pair of median marginal bristles; claws and pulvilli short.

Type.—Female, in the Museum of Comparative Zoology, Cambridge, Mass.

Redescribed from 20 specimens of both sexes. In the United States National Museum: 4 males and 3 females (including 1 female of the original type series reared from *Celerio (Deilephila) lineata* Fabr.), all labeled C. V. Riley collection, without date or locality; 1 female, from Ohio, June 25, 1901, no collector's label; 1 male, Onaga, Kans. (Crevecaeur); and 2 females, Bloomington, Ill., October, 1891 (C. C. Adams). In the Illinois State Natural History Survey: 1 male, Urbana, Ill., June 26, 1891 (Marten); and 1 female, Green Valley, Ill., September 2, 1899 (Hart). In the American Museum of Natural History: 2 females, Atherton, Mo. (C. F. Adams). In Professor Hine's collection: 1 female, from Hinckley, Medina County, Ohio, August 26, 1901 (J. S. Hine). In my collection: 3 males and 1 female, from College Station, Tex., June and July, 1918-1920 (H. J. Reinhard).

(18) *WINTHEMIA CECROPIAE*, new species

Exorista leucaniae var. *cecropiae* RILEY, Fourth Missouri Rep., p. 108, 1872; Gen. Index Missouri Reports, p. 60, 1881.

Winthemia quadripustulata (part) COQUILLET, Revis. Tachin., p. 125, 1897.—ALDRICH, Catalogue, p. 474, 1905.

Riley never published a description of his proposed variety, but one male specimen of the original type series is still preserved in the United States National Museum. *E. leucaniae* is not recognizable from the description, and with no type specimen extant, so far as known, the name is dropped. Riley's name is here used, according to type, for a large or robust form that may be readily recognized by the abbreviated claws and pulvilli and the uncommonly broad front in the male sex. I am unable to associate the corresponding female in the material examined.

Male.—Front 0.283 of the head width in the one specimen, hardly widening to middle, thence gradually downward to base of antennae; parafrontals gray pollinose tinged with yellow, thickly clothed with black hairs; median stripe reddish, broad to triangle extending on either side to vertex; vertical bristles one pair (inner) developed; orbitals none; ocellars present; frontals directed inward, the uppermost very small and considerably before triangle, the rows strongly divergent below antennae and extending opposite to base of third joint; face gray pollinose, the sides narrow, faintly yellowish and bearing rather coarse black hairs near middle; vibrissae slightly above the mouth; cheeks gray pollinose on red ground color, thickly clothed with black hairs, in profile about one-seventh the eye height; palpi yellow; antennae fully two-thirds as long as face, black, second joint about three-fifths the length of third; arista rather short, reddish, slightly thickened near base, penultimate joint short; back of head pale-haired.

Thorax black, thinly cinereous pollinose; mesonotum with five poorly defined black stripes behind and four in front of suture; scutellum obscurely reddish, covered with uniform gray pollen; calypters opaque, white, the margins with a tawny tinge.

Abdomen black, the sides not very conspicuously red, but this color extending without interruption from the hind margin of first segment to the apex of fourth; last three segments almost wholly covered with thin gray pollen devoid of any definite pattern and interrupted by a narrow dark median stripe; the hairs fine and depressed, except on anal segment; basal segments without any median marginal bristles; third with a marginal row; fourth bearing erect bristly hairs near base with stronger bristles at the apex extending forward on the sides; venter of the fourth segment thickly haired almost with matted patches, but the margins poorly defined.

Legs black, the tibiae obscurely yellow; claws and pulvilli not exceeding the length of apical tarsal joint; mid tibiae bearing one large and two smaller bristles near middle on outer front side; hind tibiae evenly ciliate.

Wings hyaline, but with a yellow tinge at base and along costa; no costal spine; venation as usual; third vein with one hair at base.

Length, 11 mm.

Type.—Male, U.S.N.M. No. 43579.

Described from the proposed type specimen reared from *Platysamia cecropia* collected at Rockford, Ill., September, 1866. Another male probably belonging to the same species is in the Illinois State Natural History Survey collection, taken October 8, 1908, "from *cecropia*" (Sanders); it differs in having the front narrower at vertex and gradually diverging all the way to base of antennae.

(19) *WINTHEMIA LATEVITTATA* van der Wulp

Exorista latevittata VAN DER WULP, Biologia Dipt., vol. 2, p. 66, 1890.

The species is known only in the male sex. It resembles *pinguis* but may be readily separated by the characters mentioned in the key.

Male.—Front at narrowest (before vertex) 0.234 of the head width in the single specimen; parafrontals clothed with short hairs; thorax marked with four black stripes narrowly separated in front but fused behind suture effecting two broad bands; palpi blackish on basal half or more, tips yellowish; abdomen with uniform bluish-gray pollen, which extends almost to the hind edge of segments 2 and 3; fourth segment largely reddish; venter of third and fourth segments thickly haired but without any sharply defined patches. Wings and legs as in *pinguis*.

Length, 9 mm.

Redescribed from one male cotype in the United State National Museum from Xucumanatlan, Guerrero, Mexico, 7,000 feet, July (H. H. Smith).

(20) *WINTHEMIA MONTANA*, new species

PLATE 1, FIGURE 1

A robust species with a supplementary outer row of frontal bristles on the widest part of the front; face tinged with yellow, the parafrontals densely gray pollinose to vertex; thorax conspicuously vittate.

Male.—Front 0.23 of the head width in the two specimens, slightly narrowed before vertex and thence widening rapidly to base of antennae; parafrontals densely pilose; median stripe reddish brown, exceeding the width of one parafrontal above; inner verticals moderately developed; outer ones about one-half as large; ocellars present, rather small; no orbitals; frontal bristles directed inward becoming smaller upward and stopping before triangle, the lowermost about on level with arista; parafacial with a few hairs near middle on inner margin, not much narrowed below; antennae black, apex of second joint and base of third reddish, third joint two and one-half times as long as second and about as wide as parafacial at narrowest; arista longer than antennae slightly thickened on proximal third, penultimate joint short; vibrissae on level with oral margin, the ridges above practically bare; palpi yellow, bearing numerous black hairs; cheeks blackish, thinly pruinose and densely haired, about one-seventh the eye height; beard white, rather bushy.

Thorax black, cinereous pollinose; mesonotum marked with four well-separated broad black stripes not interrupted at suture; scutellum beyond the narrow base red, thinly sprinkled with pale-grayish pollen; calypters white.

Abdomen black in ground color, the sides broadly reddish; last three segments gray pollinose, in a flat view the pollen extends to the hind margins of the intermediate segments; the pollen on base of fourth with reflecting spots which change from light to dark in opposite angles; first segment without median marginal bristles; second without any in one specimen and an unequally developed pair in the other; third bearing a marginal row; fourth segment covered with long bristly hairs becoming stronger toward the apex; hairs on intermediate segments depressed; genital segments yellow, small, and retracted; inner forceps blackish, longer than usual, narrow at base and tapering gradually to an acute undivided tip; outer forceps yellow, about as long as inner ones, also rather slender but not much tapering, the tips slightly bowed forward, with black bristly hairs on outer side; venter with large roundish sharply defined patches of glossy-black hairs on the third segment, none on fourth.

Legs black; hind tibiae thickly and evenly ciliate; mid tibiae with one stout anterior bristle near middle; claws and pulvilli elongate.

Wings subhyaline, brownish at base with a fainter tinge on anterior border; no costal spine; venation as usual; third vein with one hair at base.

Length, 12 mm.

Female.—Unknown.

Type.—Male, U.S.N.M. No. 43345.

Described from two specimens from Indian Creek Canyon, Chiricahua Mountains (6,100 feet), Ariz. (C. H. T. Townsend).

(21) WINTHEMIA MIMA, new species

PLATE 1, FIGURE 2

Male.—Front 0.21 to 0.24 of the head width (four measured), hardly widening to middle thence rapidly downward to antennae; median stripe brownish black, at triangle wider than one parafacial; front yellow pollinose, clothed with fine short hairs; ocellar bristles absent; verticals two pairs; orbitals none; frontal rows diverging below and extending about to the level of arista; sides of face with black hairs, which extend downward almost to the cheeks; antennae black, reaching lower fourth of face, third joint twice the length of second and slightly wider than parafacial at narrowest; arista black, slender, with a short penultimate joint; palpi black on proximal half yellow apically, beset with black hairs; cheeks gray pollinose, clothed with black hairs, in profile about one-eighth the eye height.

Thorax black, with the gray pollen thinner on mesonotum; the latter marked with four broad black uninterrupted stripes separated

by narrower pollinose bands; scutellum red beyond base, lightly dusted with gray pollen; calypters pale to golden yellow.

Abdomen black, the sides and apex reddish; last three segments with wide bands of yellowish-gray pollen, shining on hind margins; first two segments without median marginals; third with a marginal row; fourth with several irregular rows near the apex and entirely covered with bristly hairs in front; hairs depressed on intermediate segments; venter with sharply defined patches of densely matted hairs on third segment, none on fourth; inner genital forceps blackish, tapering rapidly at base and very slender beyond terminating in an acute tip; outer forceps yellow, usually bearing numerous long black hairs on the outer side, equal the length of inner pair, the width uniform from base outward to near apex which is broadly curved on posterior extremity with the anterior corner pointed and slightly produced.

Legs black; hind tibiae evenly ciliate; mid tibiae with one large bristle on outer front side near middle; claws and pulvilli elongate.

Wings subhyaline with a brownish tinge at base extending toward tip on costal border; venation normal; no costal spine; third vein with one or two hairs near base.

Length, 7 to 11 mm.

Female.—Unknown.

Type.—U.S.N.M. No. 43346.

Described from 20 specimens. Five in the United States National Museum as follows: 1, R. Charape, Peru (4,500 feet), September 14, 1911 (C. H. T. Townsend); 2, Taboga Island, Panama, February 14, 1912 (A. Busck); 1, Higuito, San Mateo, Costa Rica (Pablo Schild); 1, La Providencia, Obispo, Guatemala (C. M. Rouillard). In Professor Hine's collection: 1 from Panzos, Guatemala, March 18, 1905 (J. S. Hine). In the American Museum of Natural History: 8, Corozal, Canal Zone, January-February, 1929 (C. H. Curran); 2, Patilla Point, Canal Zone, January (C. H. Curran); 2, Chapada, Brazil (H. H. Smith); 2, Barro Colorado Island, Canal Zone, January, 1929 (C. H. Curran).

The species resembles *W. wanthocera*, but may be readily separated in the male sex by the absence of orbital bristles and the elongate claws and pulvilli. The female has not been identified in the material examined. I venture the opinion that it lacks ocellar bristles as in the male, but *wanthocera* often has them greatly reduced in size and sometimes also entirely wanting.

(22) *WINTHEMIA SINGULARIS*, new species

PLATE 1, FIGURE 3

Male.—Front at vertex 0.258 of the head width (one specimen), hardly widening for some distance below and thence rapidly to base

of antennae; parafrontals gray pollinose, with scattered short hairs and a few bristles outside of the frontal rows; uppermost frontal bristles reduced in size and stopping at triangle, the lower ones on level with base of third antennal joint; ocellars small or hairlike; orbitals none; outer verticals about half as long as inner ones; median stripe brownish black, a little narrowed behind but at triangle distinctly wider than one parafrontal; sides of face gray, bearing a few black hairs, none extending next to the eyes; antennae blackish, reaching lower fourth of face, third joint hardly twice the length of second and only slightly wider than the parafacial at narrowest part; arista black, long and slender, basal joints short but distinct; cheeks blackish, thinly covered with gray pollen, about one-seventh the eye height; palpi yellow, beset with numerous short black hairs.

Thorax black, gray pollinose; mesonotum marked with four broad distinct black stripes; scutellum broadly reddish, dusted with changeable pale-gray pollen, bearing the usual three lateral, one discal, and one small decussate apical pair of bristles; calypters tawny.

Abdomen black in ground color, the sides and apex reddish yellow; last three segments with gray pollen, which in dorsal view includes about the basal half of each, fourth segment with three reflecting or changeable spots on basal margin above; segments 1 and 2 without median marginals; third with a marginal row of about 8; fourth with a row of weak marginals and covered with bristly hairs in front; hairs on intermediate segments depressed; venter with a large sharply defined patch of long matted hairs on third segment which extends without interruption on the basal margin of the fourth; inner genital forceps blackish, narrow at base tapering uniformly to an acute undivided tip; outer forceps yellow, about as long as inner ones, perceptibly narrowed near middle with the anterior extremity broadly produced.

Legs black; mid tibiae with one stout bristle on outer front side near middle; hind tibiae evenly ciliate; claws and pulvilli elongate.

Wings faintly brownish along the costa and at base; venation normal; third vein with one hair at base; costal spine minute.

Length, 9.5 mm.

Female.—Unknown.

Type.—Male, U.S.N.M. No. 43347.

Described from 1 specimen from Tucuman, Argentina, March 21, 1918, "ex black woolly bear," with puparium on pin, no collector's label.

(23) *WINTHEMIA IMITATOR*, new species

Male.—Front 0.187 and 0.205 of the head width in the two specimens, slightly narrowed before triangle, widening rapidly downward

from middle to base of antennae; parafrontals gray pollinose to vertex, moderately haired and bearing a few bristles outside of the frontal rows below; verticals two pairs; ocellars present; orbitals none; frontal bristles extending opposite to apex of second antennal joint the uppermost erect or slightly reclinate (weak or hairlike in one specimen) and situated before triangle; antennae about three-fourths as long as face, black, third joint more or less tinged with red, slender, second joint almost two-thirds the length of the third; arista about as long as antennae, reddish, hardly thickened basally, with a short penultimate joint; face gray pollinose, the sides narrowed downward, bearing slender black hairs on the inner margins; vibrissae on level with front border of mouth; palpi reddish yellow, slender to tips, beset with black hairs; cheeks red in ground color, covered with gray pollen and dense black hairs, in profile about one-eighth the eye height; occiput densely gray pollinose, with a thick ruff of whitish hairs.

Thorax black, densely gray pollinose, marked with five black dorsal stripes, the median one narrower and obliterated in front of suture; scutellum red except the narrow basal margin, dusted with thin grayish-white pollen; calypters opaque, white the margins broadly yellow.

Abdomen red on sides and apex with a broad black median stripe widening in front and including most of the basal segment; intermediate segments covered with changeable pale-grayish pollen, which in some views extends to the hind margin of each; basal half or more of the fourth segment covered with thicker pollen, which is interrupted by a dark median stripe continuing on segments 3 and 2; hairs except on anal segment depressed; no median marginal bristles on segments 1 and 2; third bearing a marginal row of 10 to 12, large; fourth with a subdiscal and an apical row of smaller bristles; venter with defined patches of dense hairs on third and fourth tergites, small on latter; inner genital forceps of ordinary width, sharply keeled behind, tapering beyond middle to the slightly incised apex; outer forceps shorter than usual, about one-half the length of inner ones, triangular, yellow.

Legs moderately stout, black tinged with red; front claws and pulvilli about equal the length of last two tarsal joints; mid tibiae with one large bristle on outer front side near middle; hind tibiae thickly and evenly ciliate.

Wings grayish hyaline; veins reddish yellow; venation normal; no costal spine; third vein with one setule at base.

Length, 9.5 to 10.5 mm.

Female.—Unknown.

Type.—In the Illinois State Natural History Survey Museum, Urbana, Ill.

Described from two specimens received from Dr. T. H. Frison, collected at Brownsville, Tex., November 29 and December 1, 1910, no collector's label.

This species might be mistaken for *intermedia* without examining the genitalia, but may be distinguished by the longer second antennal joint, yellow calypters, stouter and shorter legs, and denser pollen on fourth abdominal segment.

(24) WINTHEMIA INTERMEDIA, new species

PLATE 1, FIGURE 4

Face and front gray pollinose; sides of abdomen broadly reddish; thoracic stripes widely separated and distinct; male often with a partial secondary row of frontals outside of the main rows below.

Male.—Front (before ocelli) 0.196 of the head width (average of five: 0.18; 0.19; 0.2; 0.18; 0.23); parafrontals clothed with fine black hairs; median stripe blackish, narrowed behind but distinctly wider than one parafrontal before triangle; ocellars present, the triangle thickly covered with erect black hairs; inner verticals moderately strong, outer ones about equal the postocellars in size; no orbitals; uppermost frontals reduced in size and stopping before triangle, the rows divergent below and extending to base of third antennal joint; sides of face silvery, moderately haired on inner margins; antennae black, base of third joint obscurely reddish, hardly twice the length of second; arista longer than antennae, slender to base, penultimate joint as broad as long; cheeks gray pollinose on red ground color, thickly covered with fine short black hairs, about one-seventh the eye height; palpi yellow more or less infuscated basally, beset with numerous black hairs to tip; beard wholly pale or whitish.

Thorax black, gray pollinose; mesonotum with four widely separated and very distinct black stripes in front and five behind the suture; scutellum red, sprinkled with whitish-gray pollen; calypters opaque, white.

Abdomen black, the sides and apex reddish; last three segments largely covered with changeable grayish-white pollen, which on base of fourth segment is interrupted by four reflecting spots that change from light to dark in opposite angles; a narrow median stripe apparent, widening to a roundish spot near base of second segment; first segment without median marginal bristles; second with or without one pair; third with a row of about 12, stout; fourth entirely covered with erect bristly hairs and bearing irregular rows of rather weak bristles near apex; hairs on intermediate segments depressed; venter

with defined patches of dense hairs on third and fourth segments, smaller on latter; genital segments yellow; inner forceps blackish, in posterior view narrower than usual, tapering from base to an acute apex, feebly keeled on basal half behind; outer forceps yellow, nearly equal the length of inner ones and also narrower than usual, tips truncate with the anterior corner bearing a minute hook; fifth sternite deeply incised, the lobes yellow bearing long black hairs on the inner margin.

Legs black, long, and slender; mid tibiae with one large bristle on outer front side near middle; hind tibiae evenly ciliate; front claws and pulvilli as long as last two tarsal joints, the hind ones somewhat shorter.

Wings tinged with yellow at base and on costal margin; venation as usual; third vein with one to three hairs at base; no costal spine.

Female.—Front at vertex 0.282 of the head width (average of five: 0.28; 0.29; 0.27; 0.29; 0.28); uppermost one or two frontals rather stout, reclinate; verticals and orbitals two pairs; third antennal joint moderately broad, about two and one-fourth times the length of second; palpi noticeably thickened apically; thorax with denser and paler pollen than in male; second abdominal segment bearing a stout pair of median marginals, the fourth with a subdiscal and a marginal row of strong bristles; hind tibiae ciliate with one or two longer bristles in the row near middle; claws and pulvilli short.

Length, 8 to 11 mm.

Type.—Male, U.S.N.M. No. 43348, from College Station, Tex.

Described from 39 specimens. In the United States National Museum 9 males as follows: 1, Melrose Highlands, Mass., September 13, 1914 (C. H. T. Townsend); 1, Cabin John, Md., July 26, 1916 (R. M. Fouts); 1, Campinas, Brazil, March, 1924 (F. X. Williams); 1, La Providencia, Obispo, Guatemala (J. M. Aldrich); 1, Higuito, San Mateo, Costa Rica (Pablo Schild); 1, Taboga Island, Panama (A. Busek); 3, Posorja, Ecuador (F. Campos), collection J. M. Aldrich. In the American Museum of Natural History: 9 males from Chapada, Brazil (H. H. Smith); 1 from Barro Colorado Island, Canal Zone (C. H. Curran). In my collection: 6 males and 14 females from College Station, Tex., April–October, 1919–1930 (H. J. Reinhard).

(25) WINTHEMIA TRICOLOR van der Wulp

PLATE 1, FIGURE 5

Exorista tricolor VAN DER WULP, Biologia Dipt., vol. 2, p. 67, pl. 3, fig. 9, 1890.

A robust species with the hind tibiae thickly and evenly ciliated; abdominal segments 2 and 3 shining on posterior half, the sides conspicuously reddish in male only, which has rather small but sharply defined patches of dense hairs on venter of third and fourth tergites; claws and pulvilli greatly elongated in male, not in female.

Male.—Front (vertex) 0.24 of the head width (average of four: 0.24; 0.24; 0.23; 0.25), not much wider at base of antennae; parafrontals rather densely short-haired, covered with gray pollen, which becomes thinner above showing a black color near the vertex; median stripe reddish brown, hardly at all narrowed behind, where it is deeply cleft by the triangle, which is thinly pollinose; verticals two pairs, rather short; no orbitals; ocellars distinct but not very large; frontal bristles directed inward stopping before triangle, the lowermost ones at or a little below base of second antennal joint; face gray pollinose, the sides bearing about a dozen slender hairs along the inner margins; vibrissae on oral margin with three or four coarse bristles on the ridges above; palpi yellow; antennae reddish, third joint darker, broad to tip and from three to four times the length of second; arista longer than antennae, thickened on proximal third, penultimate joint slightly longer than broad; checks red in ground color, gray pollinose, thickly clothed with short black hairs, about one-eighth the eye height; eye long and narrower than usual in lateral aspect, by micrometer the profile width 12 and the length 31 units; beard bushy, white.

Thorax cinereous pollinose, marked with four widely separated black stripes in front of suture and five behind; scutellum red, uniformly gray pollinose except at base, the decussate apical bristles larger than usual, hairs on disk short; calypters white tinged with yellow.

Abdomen without median marginals on segments 1 and 2; third with a marginal row of 10 to 12, large; fourth covered with erect bristly hairs at base becoming longer and stronger toward apex; in some lights the dark color of the intermediate segments extends forward on either side of the median line so that the pollen bands appear narrower above; pollinose band on base of fourth segment showing reflecting spots which change from light to dark as the angle changes, the apex red; genitalia larger than usual; outer forceps yellow, broad with blunt tips and bearing a few pale hairs on outer side; inner forceps blackish, a little longer than outer ones, in profile strongly bowed and rather thick to middle, feebly keeled on narrow base behind and hardly at all tapering to the divided apex.

Legs black; mid tibiae with one large bristle on the outer front side near middle.

Wings grayish hyaline; fourth vein with a sudden oblique bend, concave shortly beyond thence straight to costa ending well before wing tip; third vein with one or two hairs at base; costal spine minute.

Female.—Front at vertex 0.275 of the head width (average of four: 0.28; 0.27; 0.29; 0.26); thorax densely cinereous pollinose; uppermost two or three frontals reclinate, and the usual two pairs of

orbitals present; sides of abdomen black and the apex red, second segment bearing one pair of stout median marginal bristles; otherwise similar to male.

Length, 9.5 to 13 mm.

Type.—In the British Museum of Natural History.

Redescribed from 15 males and 10 females in the United States National Museum, all collected at Summit, Canal Zone (J. Zetek), and labeled "ex *Arsenura erythrinae* Fabr." One female from Higuito, San Mateo, Costa Rica (Pablo Schild), is apparently the same. In the American Museum of Natural History there are 24 specimens, including both sexes, from Chapada, Brazil (H. H. Smith). The males of this series have the outer genital forceps broader at the apex and somewhat longer but there appear to be no other tangible characters differing from the remainder of the material examined.

(26) *WINTHEMIA XANTHOCERA* Wiedemann

PLATE 1, FIGURE 6

Tachina xanthocera WIEDEMANN, Auss. Zweifl., vol. 2, p. 329, 1830.

Masipoda xanthocera WIEDEMANN, Brauer and Bergenstamm, Denk. Wien.

Akad. Wiss., vol. 56, p. 163, 1889; vol. 58, p. 402, 1891; vol. 60, p. 123, 1893.

Exorista ochracea VAN DER WULP, Biologia Dipt., vol. 2, p. 63, 1890.

Exorista rubricornis VAN DER WULP, Biologia Dipt., vol. 2, p. 66, 1890.

Exorista sorocula VAN DER WULP, Biologia Dipt., vol. 2, p. 68, 1890.

Winthemia xanthocera WIEDEMANN, Aldrich, Proc. U. S. Nat. Mus., vol. 72, p. 14, 1927.

Orbital bristles present in both sexes, claws and pulvilli minute; ocellars often poorly developed and sometimes wanting; apical joint of fore tarsi in female somewhat swollen but not noticeably elongated.

Male.—Front broader than usual with the sides almost parallel, at vertex 0.306 of the head width (average of three: 0.29; 0.32; 0.31); median stripe reddish brown, broad to triangle and occupying one-third of the frontal width; parafrontals gray pollinose, very sparsely haired from vertex downward; frontal bristles about 8 in number, extending below the middle of second antennal joint, uppermost two or three bristles stout and reclinate; inner verticals strong, nearly erect, the outer ones about two-thirds as long; face silvery, the sides narrow, bearing only a few slender hairs on the inner margin; vibrissae situated on level with oral margin; palpi yellow, bearing numerous short black bristly hairs; antennae almost reaching oral margin, basal joints blackish, third largely red, about three times the length of second; arista distinctly longer than antennae, hardly at all thickened toward base, color red to middle and darker beyond, penultimate joint very short; cheeks red in ground color, gray pollinose and covered with moderately long black hairs, about one-seventh the eye height; posterior surface of head thickly pale-haired.

Thorax black, covered with dense gray pollen tinged with brown on mesonotum; the latter marked with five black stripes, the median one narrow and disappearing in front, the outer two pairs not interrupted at suture and separated on entire length by narrower pollen stripes; scutellum reddish at tip, thickly gray pollinose except on basal margin; calypters opaque, white, the rims faintly yellow.

Abdomen black in ground color, segments 2 and 3 covered on basal half or more with dense pale yellowish-gray pollen obscuring the red color on sides, anal segment red on apical half the remainder densely pollinose; the pollen bands on these segments interrupted by a narrow dark median stripe; no median marginal bristles on basal segment; second usually without but sometimes a pair present; third with a marginal row of about 10, stout; fourth bearing a marginal and a discal row with only sparse hairs in front and behind the latter; venter of third segment with defined patches of matted long black hairs, none on fourth; inner genital forceps of moderate length, rather broad at base, narrowed more rapidly beyond middle to the apex; outer forceps about two-thirds as long, with broad evenly rounded tips, yellow.

Legs black; hind tibiae ciliate with one slightly longer bristle in the row; mid tibiae with one large median anterior bristle; claws and pulvilli very short.

Wings distinctly brown to the third longitudinal vein, the color fading out entirely near the hind border except a tinge along the apical cross vein; first posterior cell open well before wing tip; no costal spine; third vein bearing one or two setules at base.

Female.—Front hardly as wide as in male, at the vertex 0.29 of the head width (average of four: 0.29; 0.28; 0.28; 0.31); antennae wholly reddish; last joint of front tarsi swollen but not much elongate; second abdominal segment with one pair of median marginals; otherwise very similar to male.

Length, 7 to 9 mm.

Type.—In Vienna Natural History Museum.

Redescribed from 3 male and 12 female specimens from Mexico, Central America, and South America. In the National Museum 10 specimens as follows: 1 male and 1 female from British Guinea, the former labeled "sec type *Exorista sororecula*, J. M. Aldrich," the latter "sec type *Tachina xanthocera*, J. M. Aldrich"; 2 females, San Rafael, Peru (C. H. T. Townsend); 2 females, San Diego, Peru, one labeled "sec type *Exorista rubicornis*, J. M. Aldrich"; 3 females, Itaquaquecetuba, Sao Paulo, Brazil (C. H. Townsend); 1 female, La Providencia, Obispo, Guatemala (C. M. Rouillard); 1 female, Trinidad Rio, Panama (A. Busck). In the American Museum of Natural History: 1 male and 2 females, Chapada, Brazil (H. H.

Smith); 1 male and 1 female, Barro Colorado Island, and Corozal, Canal Zone (C. H. Curran).

(27) *WINTHEMIA BICOLOR*, new species

Female.—Front at vertex 0.265 of the head width in the one specimen, widening gradually downward; parafrontals gray pollinose tinged with yellow, beset with scattered fine black hairs; median stripe brownish black, narrowed toward triangle; verticals two pairs; ocellars rather small; orbitals present; frontals about eight in number, the uppermost three in each row large and reclinate, lower ones at or a little below apex of second antennal joint; face very flat, silvery, the sides greatly narrowed or almost linear below, bearing a few black hairs to about the level with tip of antennae; vibrissae large, on oral margin; antennae black, third joint four times the length of second; arista long, slender, with short basal joints; cheeks gray pollinose, sparsely hairy, about one-eighth the eye height; palpi thickened and yellow apically more or less infuscated on basal half.

Thorax black, covered with gray pollen which is thinner and tinged with yellow on mesonotum; the latter marked with five black stripes, the narrower median one distinct before the suture in most angles; scutellum broadly reddish; calypters white with yellow margins.

Abdomen largely reddish; last three segments with thin yellowish pollen on basal half or more; first segment without median marginals; second with a stout pair; a marginal row on third and fourth besides a discal row on the latter; hairs on intermediate segments depressed.

Legs rather slender; femora except at apex reddish yellow; apical joint of front tarsi moderately dilated but shorter than the two preceding joints; mid tibiae with one large bristle on outer front side near middle; hind tibiae with a row of short bristles including one longer on outer posterior side; claws and pulvilli short.

Wings somewhat infuscated especially at base and next to the costa; venation as usual; fourth vein with a rectangular bend, concave beyond to costa; first posterior cell open well before apex of wing; third vein with two hairs at base; costal spine not developed.

Length, 9 mm.

Male.—Unknown.

Type.—Female, U.S.N.M. No. 43349.

Described from a specimen collected at Itaquaquecetuba, Sao Paulo, Brazil, June 22, by C. H. T. Townsend.

The species is closely related to *pinguis* but differs in having the femora and abdomen largely yellow, the apical joint of the fore

tarsi smaller, and the parafacials narrower. There are other minor differences. The type specimen in the United States National Museum was determined *Hemimasipoda pinguis* by Dr. C. H. T. Townsend.

(28) WINTHEMIA ANALIS Macquart

PLATE 1, FIGURE 7

Microtrichodes analis MACQUART, Dipt. Exot., suppl. 1, pp. 288-289, 1846.—
BRAUER, Sitzungber. Kais. Mus., vol. 106, p. 367, 1897.

Very similar to *pinguis*, but with the front distinctly broader and with a partial secondary row of frontals outside the main rows below.

Male.—Front at vertex 0.323 of the head width in the one specimen. The abdominal cross bands broad as in *pinguis* and in dorsal view occupying about one-half the length of the segments. Venter with sharply defined patches of dense hairs on third and fourth segments. Outer genital forceps yellow, triangular, about two-thirds as long as inner ones, the tips evenly rounded or blunt; inner forceps brownish, united except near apex, keeled behind and tapering uniformly from base outward.

Length, 10 mm.

Type.—In collection of J. E. Collin, Newmarket, England.

Redescribed from a single male specimen in the United States National Museum from Rurrenabaque, Beni, Bolivia (Wm. M. Mann, Mulford Exploration). This specimen was compared with the type in 1929 by Dr. J. M. Aldrich. The National Museum contains a second male specimen labeled Catamarca, Argentina, 1927 (Kisliuk 777), which has the same wide front including the partial secondary row of frontal bristles, but the calypters are largely white and the pollen on the abdomen is not disposed in defined cross bands. It is doubtfully included here.

(29) WINTHEMIA SEXUALIS Curran

Wintheimia sexualis CURRAN, Amer. Mus. Nov. No. 260, p. 7, 1927; Dipt. Porto Rico, p. 109, 1928.

The uppermost frontal bristles stronger than usual, reclinate, situated about in line with anterior ocellus; venter of third abdominal segment with defined patches of dense hairs, none on fourth; hind tibiae sparsely ciliate with one longer bristle in the row near middle. Female sex unknown.

Male.—Front 0.212 of the head width in the one specimen, distinctly narrowed before triangle, thence widening rapidly to base of antennae; parafrontals grayish-yellow pollinose to vertex, bearing a few scattered hairs outside of the frontal rows; median stripe

brownish black, exceeding the parafrontal width except at antennae; frontal bristles about 10 in number, extending slightly below base of third antennal joint; ocellars well developed; no orbitals; verticals two pairs, strong; face gray pollinose, the sides grayish yellow, narrow, bearing a median row of 6 to 8 short fine hairs, inconspicuous; antennae black, third joint wider than parafacial, two and one-half times as long as second; arista long, thickened on basal fourth, with a short penultimate joint; palpi reddish yellow; vibrissae situated on level with front edge of mouth; cheeks thinly gray pollinose, black-haired, in profile about one-ninth the eye height; back of head clothed with moderately dense pale gray or whitish hairs.

Thorax black, gray pollinose, with four broad very distinct stripes separated on entire length by pollen bands, the median one widest; scutellum obscurely reddish on apical half, dusted with changeable gray pollen; calypters opaque, white.

Abdomen black in ground color, the sides obscurely tinged with red, apical half of anal segment bright reddish yellow; intermediate segments gray pollinose on basal half or more, the pollen becoming thinner posteriorly with the apices shining in certain views but apparently subpollinose to the hind margin on each; fourth segment with denser gray pollen confined to the basal third above, without any reflecting spots on either side of the median vitta which extends forward interrupting the pollen on segments 3 and 2; hairs rather sparse, depressed except on fourth segment; no median marginal bristles on first segment; second with one pair, strong; third with a marginal row of 8 or 10, large; fourth bearing a subdiscal and a marginal row of smaller bristles; genital segments yellow, small and retracted; genitalia not in position to examine.

Legs moderately stout, black tinged with red; claws and pulvilli elongate; mid tibiae with one stout anterior median bristle.

Wings grayish hyaline but with an apparent brownish tinge all over; rather narrow at base and much longer than the abdomen; fourth vein with a sudden oblique bend, only slightly concave beyond reaching costa well before exact wing tip; third vein with two hairs at base; costal spine very minute.

Length, 7 mm.

Type.—Male, in the American Museum of Natural History, from Porto Rico.

Redescribed from a male specimen (paratype) collected at Adjuntos, Porto Rico, June 8-13, 1915 (Lutz and Mutchler), received from C. H. Curran, to whom it is returned.

Tachina elegans, also described from Cuba (female only), may prove to be the opposite sex of the present species. I leave the ques-

tion open; it seems impossible to decide except by additional material from the type locality.

(30) *WINTHEMIA PINGUIS* Fabricius

PLATE 1, FIGURES 8 AND 9

Musca pinguis FABRICIUS, Syst. Antl., p. 302, 1805.

Tachina pyrrophypga WIEDEMANN, Auss. Zweifl., vol. 2, p. 319, 1830.

Exorista rufilatera RONDANI, Nuovi Ann. Sci. Nat. Bologna, p. 9, 1850.—GIGLIOTTOS, Ditt. del Mess., ser. 2, pt. 3, p. 37, 1893.

Chaetolyga erythropypga BIGOT, Annales, p. 257, 1888.—BRAUER, Sitzungsber. Kais. Mus., vol. 106, p. 348, 1897.—GOWDY, Cat. Ins. Jamaica, p. 83, 1927.

Masipoda geminata BRAUER and BERGENSTAMM, Zweifl. Kais. Mus., vol. 4, p. 162, 1889; vol. 5, pp. 402, 430, 1890; vol. 6, p. 123, 1891.—VAN DER WULP, Biologia Dipt., vol. 2, p. 211, 1890.—ALDRICH, Ann. Ent. Soc. Amer., vol. 18, p. 128, 1925, refers to *Winthemia*.

Exorista latimana VAN DER WULP, Biologia Dipt., vol. 2, p. 67, pl. 3, fig. 10, 1890.

Exorista consobrina VAN DER WULP, Biologia Dipt., vol. 2, p. 68, 1890.

Hemimasipoda brasiliensis TOWNSEND, Revista Museu Paulista, vol. 15, p. 267, 1926.

Male.—Front (before ocelli) 0.225 of the head width (average of four: 0.2; 0.26; 0.19; 0.25); parafrontals yellow pollinose, narrow above widening rapidly downward, beset with short hairs which are thicker near vertex; median stripe brownish red, hardly at all narrowed behind and exceeding the width of one parafrontal at triangle; verticals two pairs; orbitals none; ocellar bristles present though sometimes minute; frontal bristles 10 to 14 in number descending to base of third antennal joint, the uppermost reclinate, stouter than the preceding ones but not very long; face densely gray pollinose, the sides silvery, narrow, and sparsely to moderately black-haired; vibrissae strong, situated on level with oral margin; antennae almost as long as face, black, third joint about three times the length of second; arista unusually long and slender to base, penultimate joint very short; cheeks about one-sixth the eye height, gray pollinose and thickly covered with short black hairs; palpi yellow more or less infuscated basally, beset with numerous black hairs.

Thorax black with gray pollen; mesonotum marked with four subshining black stripes, which are coalescent behind the suture and narrowly separated in front appearing as two broad black bands to the naked eye; scutellum reddish at tip, gray pollinose; calypters opaque, white with a tawny tinge.

Abdomen black in ground color, the sides and apex obscurely reddish; segments 2 to 4 with very distinct grayish pollen bands, which include the basal half or more, the remainder shining, along the median line the pollen is interrupted by an indistinct stripe; first segment without median marginals; second usually without but

sometimes a pair present; third bearing a marginal row of 12 to 14, large; fourth covered with erect hairs in front, bearing numerous bristles on sides near apex besides a marginal row; venter with sharply defined patches of matted glossy-black hairs; genitalia small, retracted; the united inner forceps keeled behind tapering from base to apex, which is shallowly notched; outer forceps yellow, about two-thirds as long as inner ones, not much narrowed before the evenly rounded tips, outer side bearing fine pale hairs.

Legs black; mid tibiae with one large median anterior bristle; hind tibiae ciliate; claws and pulvilli longer than last tarsal joint.

Wings distinctly brown on anterior margin, this color extending rather faintly backward into the first posterior and discal cells, paler behind; fourth vein with an oblique bend ending in costa well before apex of wing; costal spine minute; third vein bearing two or three hairs at base.

Female.—Front 0.29 of the head width (average of five: 0.3; 0.29; 0.27; 0.3; 0.29); ocellars strong; two pairs of verticals and orbitals, large; two uppermost frontals stout and reclinate; claws and pulvilli minute, apical joint of fore tarsi conspicuously swollen and approximating the combined length of three preceding joints; hind tibiae with one longer bristle in the outer posterior row; abdomen usually more reddish on sides than in male, second segment with one pair of large median marginals, fourth with a marginal and a subdiscal row.

Length, 7 to 11 mm.

Type.—In the Zoological Museum, Copenhagen, Denmark.

Redescribed from numerous specimens of both sexes in the United States National Museum, including 2 males labeled "cotypes *Eworista latimana* van der Wulp"; 1 female paratype *Hemimasipoda brasiliensis* Townsend; 2 males and 1 female determined *Masipoda geminata* by Brauer and Bergenstamm; 1 male labeled "*Masipoda geminata* comp. type, J. M. Aldrich"; and 1 male labeled "type *Tachina pyrrophyga* Wiedemann," received for study from the Vienna Museum. Distribution records: Teapa, Tabasco, Mexico (H. H. Smith); Sao Paulo, Brazil (C. H. T. Townsend); San Mateo, Costa Rica (Pablo Schild); Posorja, Ecuador (F. Campos); Quirigua, Guatemala (J. M. Aldrich); Ancon, Canal Zone (C. T. Greene); Las Cascadas, Canal Zone (A. H. Jennings); Campinas, Brazil (F. X. Williams); R. Charape and Yahuar Mayo, Peru (C. H. T. Townsend); Coban, Alta Vera Paz, Guatemala (J. M. Aldrich); La Providencia, Obispo, Guatemala (C. M. Rouillard, J. M. Aldrich); Mayaguez, Porto Rico (R. H. Van Zwalenburg); Rurrenabaque, Beni, Bolivia (Wm. M. Mann, Mulford Exploration); Catamarca, Argentina (Kisliuk); Taboga Island and Alhajuelo, Panama (A. Busck); and Barro Colorado Island, Canal Zone (C. T. Greene).

(31) WINTHEMIA SIGNATA, new species

PLATE 1, FIGURE 10

Intermediate joints of the front tarsi transversely broadened in male; thoracic stripes fused appearing as two solid black bands to the naked eye; abdomen shining black with defined pollinose cross bands on basal half of segments 2 to 4.

Male.—Front 0.245 of the head width (average of four); parafrontals gray pollinose, widening rapidly downward; median stripe brownish black, wider than one parafrontal at the triangle; verticals two pairs: no orbitals; ocellars present, proclinate; frontals descending to base of third antennal joint, not much reduced above, the uppermost two or three pairs reclinate; antennae black, third joint hardly exceeding twice the length of second; arista rather long, only slightly thickened on basal fourth, penultimate joint short; face silvery pollinose, the sides with a few hairs extending downward to the cheeks; the latter faintly pruinose, covered with black hairs, about one-eighth the eye height; vibrissae situated on level with oral margin; palpi black.

Thorax black, pleura lightly dusted with gray pollen shining in certain angles; mesonotum with a median and two broader lateral pollinose stripes; scutellum black the apex obscurely reddish, covered with bluish-gray pollen except near base; with the usual three lateral bristles, besides one discal and a small decussate upturned apical pair; calypters white tinged faintly with yellow.

Abdomen black in ground color, the sides and apical half of fourth segment reddish; basal third to half of segments 2 to 4 with dense gray pollen bands, the remainder of the intermediate segments shining black: first segment without median marginals; second usually with one pair (absent in one specimen); third with a marginal row of about 10; fourth with a discal row and several irregular rows of smaller bristles before apex, destitute of hairs on basal margin above; venter with large roundish defined patches of matted glossy-black hairs on third segment, with similar but smaller patches on the fourth segment; hairs on dorsum of intermediate segments depressed.

Legs black, the intermediate joints of the front tarsi strikingly flattened, about twice as broad as long; mid tibiae with one stout bristle on outer front side near middle; hind tibiae ciliate; claws and pulvilli elongate.

Wings subhyaline, brownish at base and along costal border; fourth vein arcuate beyond bend reaching costa well before apex of wing; third vein with one or two small bristles at base; costal spine small and inconspicuous.

Length. 8.5 to 10 mm.

Female.—Unknown.

Type.—Male, U.S.N.M. No. 43350, from Lima, Peru.

Described from 6 specimens. Four in the United States National Museum from Lima, Peru, December 27, 1912, and January 11, 1913 (C. H. T. Townsend). Two in the American Museum of Natural History, 1 from Fort Randolph, Canal Zone (C. H. Curran), and 1 from Chapada, Brazil (H. H. Smith).

In the development of the fore tarsi the species approaches *W. okefenokeensis* rather closely but can be separated very readily by the characters mentioned in the key. I have been unable to associate the female sex in the material examined.

(32) *WINTHEMIA OKEFENOKEENSIS* Smith

Winthemia okefenokeensis SMITH, Proc. Ent. Soc. Washington, vol. 18, p. 95, 1916.—CURRAN, Dipt. Porto Rico, p. 103, 1928.

Okea okefenokeensis SMITH, TOWNSEND, Ins. Insc. Menst., vol. 4, p. 74, 1916.

The intermediate joints of the front tarsi strikingly flattened and obliquely expanded in the male, ordinary in the female; thoracic stripes separated on entire length by pollinose bands of nearly equal width; abdominal segments 2 and 3 gray pollinose or subpollinose to the hind margins.

Male.—Front (before ocelli) 0.192 of the head width (average of five: 0.18; 0.19; 0.2; 0.2; 0.19); parafrontals gray pollinose to vertex, moderately haired outside of frontal rows; median stripe not much narrowed behind, at antennae about as wide as one parafrontal; inner verticals moderately developed, the outer ones about three-fourths as long; orbitals none; ocellars rather short but usually quite distinct (absent in one specimen); frontals 10 to 14 in number, extending to level with base of third antennal joint, the upper bristles stopping at apex of triangle not much reduced in size, erect or slightly reclinate; face gray pollinose, the sides more silvery and sparsely haired to near lower extremity; antennae fully three-fourths the length of face, black, the apex of second and base of third joint reddish, the latter one and one-half times the length of second; arista reddish, hardly exceeding the length of antennae, slender beyond proximal third, basal joints short; palpi yellow, more or less infuscated basally and thickly black-haired; cheeks gray pollinose on red ground color, about one-seventh the eye height; beard white.

Thorax black, gray pollinose; mesonotum marked with four broad black stripes, outer ones not interrupted at suture; scutellum red on apical half or more, dusted with uniform gray or whitish pollen; calypters white.

Abdomen with the sides of the three basal segments and the fourth wholly reddish yellow; the gray pollen on the anal segment narrowing from the sides toward the middle above; segments 1 and

2 without any median marginal bristles; third bearing a marginal row of about 10; fourth with a row of smaller bristles near apex and covered in front with erect bristly hairs; venter of third and fourth segments bearing sharply limited patches of dense long black hairs, usually small on the latter; genital segments yellow, small and retracted; inner forceps united and keeled behind, tapering gradually from base to apex, which is slightly bowed forward; outer forceps yellow, hardly two-thirds as long as inner ones, the tips blunt or broadly rounded.

Legs black; mid tibiae with one stout anterior bristle near middle; hind tibiae ciliate; claws and pulvilli exceeding the length of last tarsal joint.

Wings grayish hyaline; first posterior cell open well before wing tip; third vein with one or two hairs at base; costal spine minute.

Female.—Front at vertex 0.276 of the head width (average of three: 0.28; 0.27; 0.28), not much wider at base of antennae; the usual two pairs of orbitals present; median stripe uniform in width to triangle and occupying one-third of the frontal width; apical joint of fore tarsi somewhat swollen but not much longer than usual; hind tibiae subciliate with one longer bristle near middle; claws and pulvilli short; abdomen usually showing less red on sides than in male, second segment bearing one pair of median marginals, fourth with a discal and a marginal row.

Length, 6 to 9 mm.

Type.—Male, U.S.N.M. No. 20054, from Billys Island, Okefenokee Swamp, Ga.

Redescribed from 10 males (including type) and 3 females in the United States National Museum as follows: 8 males and 1 female, labeled "E E A Cuba 8129"; 1 male and 1 female, Habana, Cuba (Baker), collection of J. M. Aldrich; 1 male, Billys Island, Okefenokee Swamp, Ga., June, 1912 (J. Chester Bradley); 1 female, Spring Creek, Decatur County, Ga., July 16–29, 1912, without collector's label. One female, more robust than the remainder of the series, from Miami, Fla., November 3 (C. H. T. Townsend), is apparently the same.

UNRECOGNIZED SPECIES OF WINTHEMIA²

The types of all the following species, except Walker's and Bigot's, are apparently lost, and the original descriptions are too inadequate to recognize the forms:

Exorista leucaniae KIRKPATRICK, Ohio Agr. Rep. for 1860, p. 757, 1861. Ohio; reared from *Leucania unipuncta*.

Exorista ostensackenii KIRKPATRICK, Ohio Agr. Rep. for 1860, p. 757, 1861. Ohio; reared from *Leucania unipuncta*.

² *Winthemia obscura* Coquillett, Revis. Tachin., p. 124, 1897, equals *Eupogona* (Aldrich, Proc. Ent. Soc. Washington, vol. 30, p. 44, 1923).

Senometopia militaris WALSH, Trans. Illinois State Agr. Soc., vol. 4, pp. 367-8, 1861. Illinois; reared from army worm.

Tachina picea WALKER, Ins. Saund., p. 293, 1852. Described from Colombia, South America. The type, a male, is in the British Museum under the name *Chaetolyga*. The following notes were taken from the type by Dr. J. M. Aldrich in 1929: "A large *Winthemia* male, not in best condition. Antennae rather long, second joint wholly red; third brown on upper and apical part. Above vibrissae the small bristles form something of a tuft. Cheek one-eighth to one-tenth of eye height; palpi wholly yellow. Mid tibia with one bristle; hind tibia ciliate. Sternopleural, 1, 1. Front tarsi normal with claws and pulvilli not greatly enlarged. A very marked sexual patch on third segment extending on fourth, with dense brown brush on both. No median marginals on second segment; third with row of 12; fourth segment with numerous bristles on sides and apical half. Calypters white. Third vein with two hairs. Ocellars small; frontals to base of third antennal joint. Length 12.5 mm." It does not seem to be identical with any other species discussed in this paper and appears to be a distinct form of which I have seen no specimens.

Tachina subpicea WALKER, Ins. Saund., p. 297, 1852. Described from Brazil. Type in the British Museum as *Chaetolyga*. The latter was also examined by Dr. J. M. Aldrich, whose notes indicate that this form is a synonym of the preceding species.

Tachina elegans BIGOT, in Sagra's Cuba, vol. 7, p. 810, 1857. Described from Cuba; the type, a female, is in the collection of J. E. Collin, Newmarket, England. Dr. J. M. Aldrich has also examined this type and states that "the type has no parafacial hairs, but is not in best condition. Fourth abdominal segment red; last joint of front tarsi enlarged, nearly as long as three preceding ones; sternopleurals two; hind tibiae densely ciliated; mid tibiae with one bristle on outer front side near middle." This may prove to be an earlier name for *Winthemia sexualis* Curran, also described (male only) from Cuba.

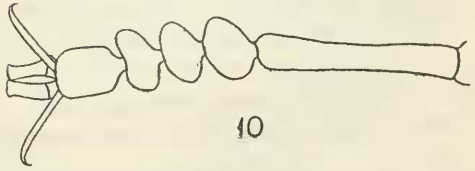
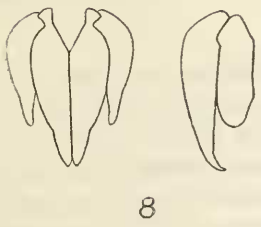
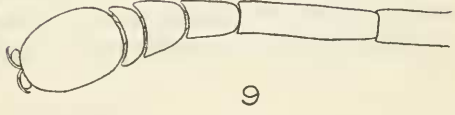
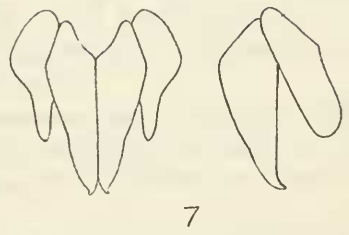
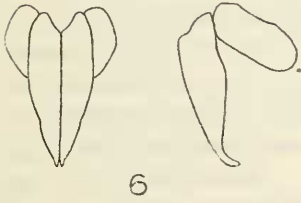
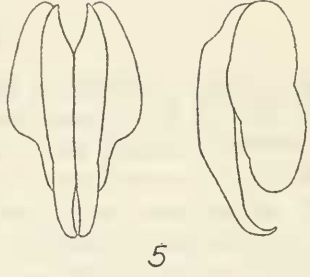
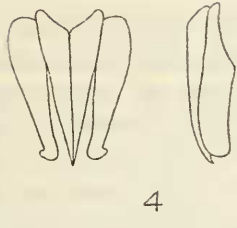
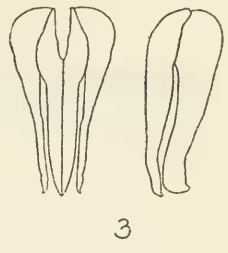
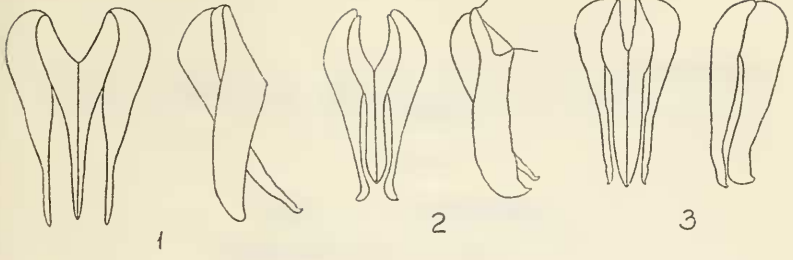
Exorista infesta WILLISTON, Illinois Ent. Rep., p. 65, 1885. Illinois; reared from *Laphygma frugiperda*.

Exorista platysamiae TOWNSEND, Trans. Amer. Ent. Soc., vol. 19, p. 288, 1892. Described from a single female specimen reared from *Platysamia cecropia*, Ithaca, N. Y. According to the original description the type has only one proclinate orbital bristle. In the material examined, I have not seen any species in agreement with this character.

EXPLANATION OF PLATE 1

(Drawings by Charles T. Greene)

- FIGURES 1-8. Rear and lateral view of male genital forceps, all enlarged:
 1, *Winthemia montana*, new species; 2, *W. mima*, new species;
 3, *W. singularis*, new species; 4, *W. intermedia*, new species; 5,
W. tricolor van der Wulp; 6, *W. xanthocera* Wiedemann; 7, *W.*
analis Macquart; 8, *W. pinguis* Fabricius.
 9, *Winthemia pinguis* Fabricius, front tarsus of female.
 10, *Winthemia signata*, new species, front tarsus of male.



SPECIES OF WINTHEMIA
FOR EXPLANATION OF PLATE SEE PAGE 54